

**DEPUTY MINISTERS' COMMITTEE ON THE
PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE**

**NOVEMBER 29th, 2017
1:00 pm to 2:30 pm**

**80 Wellington Street
Room 415**

AGENDA

1. Welcome (ECCC & PCO)

**2. A) Clean Technology Recommendations: Horizontal Business Innovation and
Clean Technology Review (TBS)**

- TBS will present on challenges and opportunities associated with better federal facilitation of innovation in clean technology. Two of their recommendations may be of greater interest to INFC.
- *Recommendation 1* calls upon federal entities such as ECCC, NRCan, ISED and AAFC to improve capacity to better define outcomes, set targets, and measure/monitor environmental impacts (e.g., GHG emissions or climate risk) associated with specific initiatives. You may wish to highlight that this work should not overlook qualitative climate outcomes, such as those connected to the human elements of climate change, e.g., increased isolation of people in northern communities where rising temperatures render roads or ice roads unusable.
- *Recommendation 5* calls on the government to strengthen its focus on energy projects. At the present time INFC does not have a specific mandate to support emerging renewable energy technologies (i.e., projects that are nearing commercialization, such as tidal and geothermal generation). Under the Investing in Canada Plan, NRCan will manage a national program focused on emerging renewables, whereas the [REDACTED]

[REDACTED] There is potential, however, for INFC to support emerging technologies through future programming, should it be deemed necessary to effectively promote innovation and/or enhance emissions reductions.

Points to Register:

- This important work should not overlook areas of investigation beyond quantifiable impacts, which are only part of the story. We should endeavour to develop capacity to assess and monitor qualitative climate outcomes, such as those connected to the human elements of climate change.

B) Clean Growth Hub (*ISED and NRCAN*)

- The Hub is a whole-of-government focal point for clean technology. The Hub is meant to assist stakeholders in navigating the federal supports available for clean technology and to facilitate cohesion and the sharing of information across departments.
- INFC is not a member of the Hub and there are no implications for the department at this time.

Points to Register:

NIL

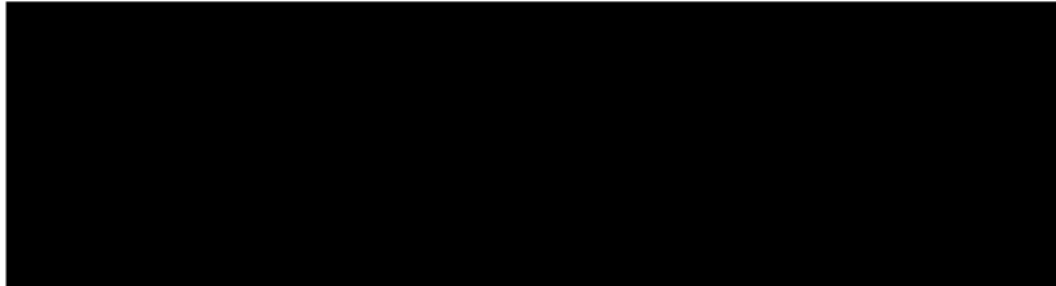
3. First Annual Synthesis Report to First Ministers on the Status and Implementation of the PCF and Coordination of Communications Strategy Around the December 9th Anniversary (*ECCC*)

- ECCC is currently consolidating the results of the progress reports by individual Ministerial tables involved in the Framework, to finalize a Synthesis report for presentation to First Ministers which will coincide with the Framework's first anniversary on December 9, 2017.
- The Synthesis report discusses progress made this year toward achieving the objectives laid out in the PCF.
- A draft of the infrastructure table report was shared with ECCC to support the preparation of the synthesis report. After awaiting any final input from provinces and territories (most have not provided specific input after multiple opportunities), INFC will be seeking the Minister's final approval of that table report shortly.
- INFC shared DM-level redline comments on the Synthesis report with ECCC last week.



Points to Register

→



Proposed text:

“Federal infrastructure funding will support grid infrastructure. Provinces and territories will receive \$9.2 billion through Integrated Bilateral Agreements for priority green infrastructure projects, which could include better-connected electricity systems. At least \$5 billion will be available through the Canada Infrastructure Bank over the next 11 years for green revenue generating infrastructure projects that are in the public interest, including those that reduce greenhouse gas emissions, deliver clean air and safe water systems, and promote renewable power.”

- **The Progress Report prepared on behalf of the FPT Ministers responsible for infrastructure is currently in approvals. While we have shared previous drafts with ECCC to support the finalization of the synthesis report, we have faced challenges in soliciting final input from our PT interlocutors. We will have a finalized version to ECCC very soon.**

4. A) Adaptation and Climate Resilience Pillar (ECCC)

- This information is presented for information only, to bring the committee up to date on the various adaptation and resilience activities taking place under the Framework.
- The *Adaptation and Climate Resilience Overview Deck* focuses on 2017 programs that are currently in place -- which is why INFC's programs are generally not covered in the deck. The Investing in Canada Plan is listed on p. 7, but is not mentioned in Budget 2017 slides as it has not yet been implemented.
- The deck also mentions the Commissioner of the Environment and Sustainable Development (CESD) Audit. The fall 2017 CESD Audit found that a total of nine departments and agencies, INFC and ECCC among them, did not fully assess climate change risks in their departmental risk management processes. INFC

agreed with the findings and committed to better addressing climate change challenges going forward, including through the Climate Lens.

- INFC programs directly contribute to addressing **three** out of the **five** adaptation themes identified in connection to the PCF:
 - 1) **Building Climate Resilience through Infrastructure:**
 - NRC-INFC Climate Resilient Buildings and Core Public Infrastructure (CRBCPI) project
 - Investing in Canada infrastructure Program (Adaptation, Resilience and Disaster Mitigation sub-stream)
 - The Climate Lens
 - 2) **Supporting Particularly Vulnerable Regions:**
 - Disaster Mitigation and Adaptation Fund
 - 3) **Reducing Climate-related Hazards and Disaster Risks:**
 - Disaster Mitigation and Adaptation Fund
 - Investing in Canada infrastructure Program (Adaptation, Resilience and Disaster Mitigation sub-stream)

Points to Register:

- **INFC commends the strong collaboration on adaptation issues across federal government departments.**
- **INFC welcomes further DM-level targeted discussion on how we can collectively advance federal adaptation and resilience objectives.**

B) Northern Adaptation Strategy (INAC)
[SOME DOCUMENTS NOT YET CIRCULATED]

- The Northern Adaptation Strategy is a key deliverable under the adaptation and climate resilience pillar of the Pan-Canadian Framework on Clean Growth and Climate Change.
- The development of the Strategy is led by Crown-Indigenous Relations and Northern Affairs (CIRNA). The purpose of the strategy is to establish partnerships and collaboration mechanisms to:
 - Articulate impacts of climate change; and
 - Guide actions and investments.

- Following general agreement on the framework for the Strategy, the Strategy itself is now in the drafting and approvals phase planned to last until summer 2018.
- Provinces and territories have indicated they would like to be signatories to the Northern Adaptation Strategy.
- Infrastructure is mentioned under all three priorities of the Northern Adaptation Strategy (*Observe and Understand Impact; Plan to Reduce Risks; and Act to Create Resilience*).

Points to Register:

- **Funding provisions under the Green Infrastructure stream of the Investing in Canada Infrastructure Program could potentially contribute to achieving the proposed outcome of the Northern Adaptation Strategy, specifically:**
 - **Climate Change Mitigation (Budget 2017); and**
 - **Adaptation, Resilience, Disaster Mitigation (Budget 2017).**
- **The Climate Lens, which includes a resilience assessment component, will apply to mitigation and adaption projects under the Climate Change Mitigation and Adaptation, Resilience and Disaster Mitigation sub-streams of the ICIP. Projects submitted under the Rural and Northern Community Infrastructure stream (and other streams and sub-streams) will be subject to the Lens when project costs exceed an appropriate threshold.**

C) Canadian Centre for Climate Services

- ECCC is currently developing a Canadian Centre for Climate Services, which will focus on two main areas of action related to enhancing Canada's resilience to climate change. These are:
 - Providing climate information, data, and tools via climate archives, a climate services portal, data and products, as well as user support and training; and
 - Coordination and outreach via the organization's national office, partnership funding for regional climate consortia, and engagement.
- The Centre will address a range of issues, including data availability and use, diversity of potential clientele, questions of local application, evolving needs, and a deficit of data and capacity specific to Canada's north.

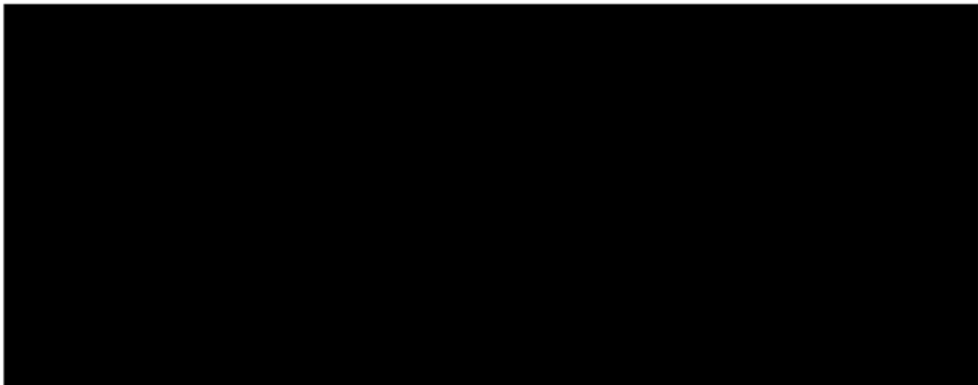

- The intention is to design the Centre to respond to any gaps in providing support to local governments and other stakeholders, in concert with the FCM's programs, NRCan's BRACE programs, and PT-led initiatives such as Ontario's forthcoming climate service entity, to support uptake of adaptation funds available under the ICIP.
- The Centre will be led by an Executive Director within the Pan-Canadian Framework Implementation Office of Environment and Climate Change Canada.
- As a key result of the PCF and in taking a "whole of government" approach, the Centre will leverage the established PCF governance mechanisms (inter-departmental and inter-governmental) for information exchange and broad strategic discussion to ensure alignment of PCF activities and results.
- The Centre's work may influence future iterations of assessment guidance prepared for the resilience component of INFC's Climate Lens.

Points to Register:

NIL

5. Roundtable Updates / Next Steps

- *COP23 Debrief*
 - COP 23 took place November 6 – 17, 2017 in Bonn, Germany.
 - COP 23 was the 23rd annual Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). The annual COPs serve as the Convention's supreme decision-making body, where all states that are parties to the Convention take part in:
 1. Reviewing the implementation of the Convention and any other legal instruments the COP adopts; and
 2. Decision-making relevant to the effective promotion of the Convention, including through the adoption of institutional and administrative agreements.
 - This item does not present any implications for INFC at this time.
- *Coal phase out and natural gas-fired regulations (and potentially broader update on regulatory process) (ECCC)*

- NRCan will present a deck updating on new GHG regulations being applied in the electricity sector.
- Phasing out coal-fired generation is the key focus of emissions-reductions initiatives in the electricity sector. Coal is currently a primary or major fuel source in Alberta, Saskatchewan and Nova Scotia. Ontario has already phased-out coal as a source of electricity and Manitoba plans to decommission its back-up coal facility by 2019.
- The federal government is amending the *Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity* regulations to accelerate coal phase-out by 2030. These amendments will impact seven facilities in Nova Scotia, five facilities in Alberta, one facility in Saskatchewan and one facility in New Brunswick.
- Natural gas is being targeted as a 'transition fuel' which will enable the phase-out of coal. This transition will be complemented by recently proposed emissions intensity standards for natural gas facilities that will vary by facility size and technology.
- While natural gas emits roughly half as many GHGs as anthracite coal, it is still a considerable source of emissions (when carbon capture technology is not employed).
- 
- 
- INFC has reached out to ECCC to discuss this matter. Further discussions with both ECCC and NRCan will be required.

Points to Register

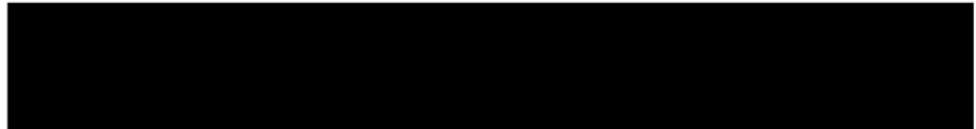
→ How many new natural gas-powered generation facilities are expected to emerge as a result of the coal phase-out?

→



- *LCEF Funding Decisions* [SOME DOCUMENTS NOT YET CIRCULATED]

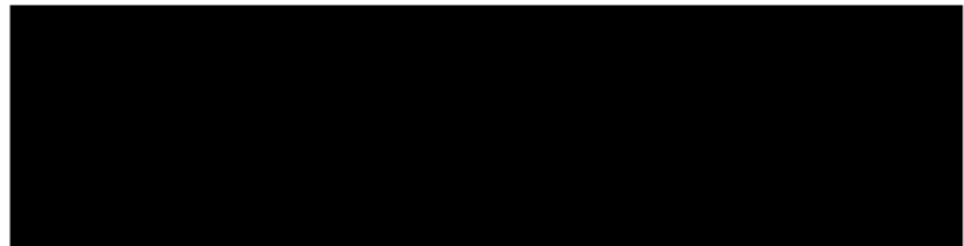
-



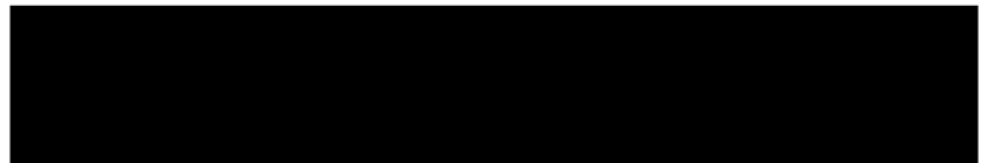
- Electricity projects proposals are not included in the LCEF assessment as they are referred to INFC and NRCAN to be considered under those department's respective programs.

- INFC has participated in the assessment of one project for [REDACTED] INFC has also been collaborating with ECCC and assessing PT projects that could potentially be better aligned for funding under the IBAs.

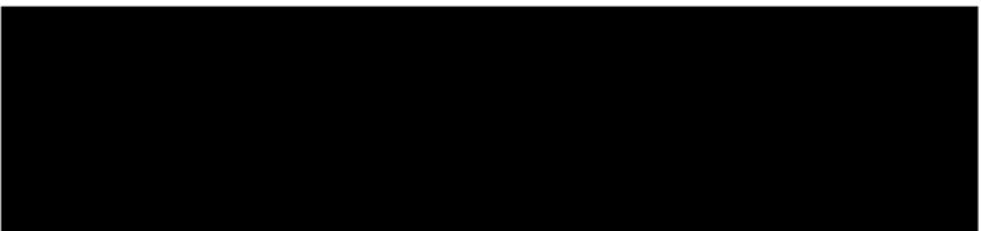
-



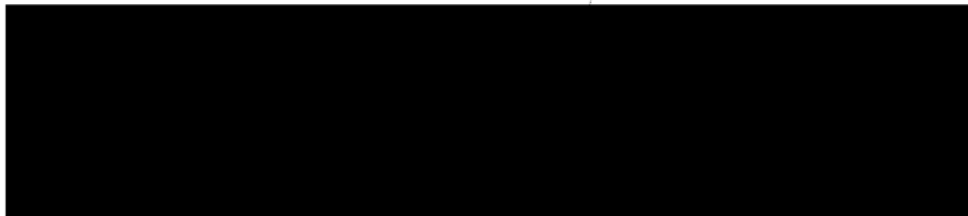
-



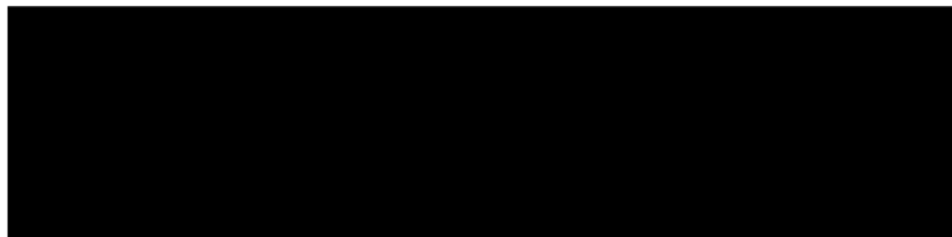
-



○



○



Points to Register

- **Were LCEF projects assessed based on a cost-per-tonne metric? If so, how was the cost-per-tonne calculated, and which types of projects performed particularly well?**
- **I see that only the “high-range” scenario for GHG reductions has been shared – what is ECCC’s level of confidence that the high-range scenario will be achieved?**
- *Forward Agenda*
 - ECCC and/or NRCan may raise the topic of electricity and strategic interconnections, which is an item jointly led by INFC and NRCan. ECCC would like INFC to make a joint presentation with NRCan -- possibly as soon as the next meeting of the PCF-DMC.
 - ECCC is heavily focused on establishing clear funding windows for individual strategic intertie projects, given their very significant potential for emission reduction. ECCC had hoped to receive a status update on the item at the November meeting. However, given that INFC remains early in the process of IBA negotiations, and dialogues under NRCan’s Regional Electricity Cooperation and Strategic Infrastructure initiative (RECSI) have not yet been completed, the two departments have no further tangible information to share regarding the PTs’ plans for specific strategic intertie projects.
 - The RECSI dialogues are expected to provide provinces, territories, and other stakeholders with a forum to put forward ideas for future strategic

interconnections between jurisdictions.

- NRCan will likely also play a key role in the development of these projects, [REDACTED]
- Further, NRCan has met several times with the CIB Transition Office to discuss electricity infrastructure. The CIBTO has communicated that the CIB will invest in projects:
 - a) which crowd-in private sector and institutional capital in areas where it normally would not invest;
 - b) where the project structure includes a private investor as co-financier and co-owner, and where an asset can be structured as an isolated entity (e.g., separate from a larger public electricity grid);
 - c) where there is sufficient revenue or patronage risk to be transferred to the private sector or institutional investor;
 - d) that further the Government's priorities under the Investing in Canada Plan; and
 - e) that have provincial, territorial, and/or municipal support.
- The CIBTO has informed NRCan that the Government will communicate these expectations to the Bank in the Statement of Priorities and Accountabilities (SPA). [REDACTED]
- You may wish to invite Glenn Campbell to join you for a formal discussion on this topic at a future meeting.

Points to Register (If Pressed on Electricity Infrastructure)

- **Though we are now extensively involved with the PTs to develop Integrated Bilateral Agreements, discussions at this stage revolve around communicating the scope of the program, targeted outcomes, reporting requirements, and other administrative matters.**
- **INFC has not received any feedback from PTs regarding potential priority electricity infrastructure assets, and as a result we are not in a position to provide a new update to the committee at this time.**

ANNEXES

- 1a ADM Committee Agenda
- 1b PCF-DMC Record of Discussion – October 25, 2017
- 2a Horizontal Business Innovation and Clean Tech Review
- 2b Clean Growth Hub Summary
- 2c Clean Growth Hub Update Deck
- 3a Synthesis Report Summary
- 3b Synthesis Report
- 3c Summary Communications Strategy
- 3d Communications Priorities Placemat
- 4a Adaptation and Climate Resilience Summary Note
- 4b Adaptation and Climate Resilience Deck
- 4c Northern Adaptation Summary
- 4d Northern Adaptation Strategy Process
- 4e Proposed Northern Adaptation Strategy at a Glance
- 4f Canadian Centre for Climate Services Deck
- 5a NOT YET CIRCULATED
- 5b NOT YET CIRCULATED
- 5c LCEF Summary
- 5d Leadership Fund Stats
- 6a Climate Change Science Plan
- 6b PCF Implementation Tracker
- 6c PCF Milestones and Events Calendar
- 6d PT Engagement Calendar
- 6e Forward Agenda

**DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE
PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE**

NOVEMBER 29th, 2017

1:00 pm to 2:30 pm

**80 Wellington Street
Room 415**

AGENDA

1. Welcome (ECCC & PCO)
2. TBS-led Horizontal Business Innovation and Clean Technology Review – clean technology recommendations (TBS)
 - Update on Clean Growth Hub (ISED and NRCAN)
3. First Annual Synthesis Report to First Ministers on the Status and Implementation of the PCF (ECCC) and Coordination of Communications Strategy Around the December 9th PCF Anniversary (ECCC)
4. Adaptation and Climate Resilience Pillar (ECCC and NRCan) and Northern Adaptation Strategy (INAC); update on Canadian Centre for Climate Services (ECCC)
5. Roundtable Updates / Next Steps
 - COP 23 debrief (ECCC)
 - Coal Phase Out, Natural Gas Regulations and Other Regulatory Process (ECCC)
 - LCEF Funding Decisions (ECCC)

Annex Documents:

- a) Targeted Federal Climate Change Science Plan (ECCC)
- b) PCF Implementation Tracker
- c) PCF Milestones and Events Calendar
- d) PT Engagement Calendar
- e) Forward Agenda

Protected B

**Deputy Minister Oversight Committee on the Pan-Canadian Framework on Clean Growth
and Climate Change**

Record of Discussion - October 25, 2017

1. Welcome

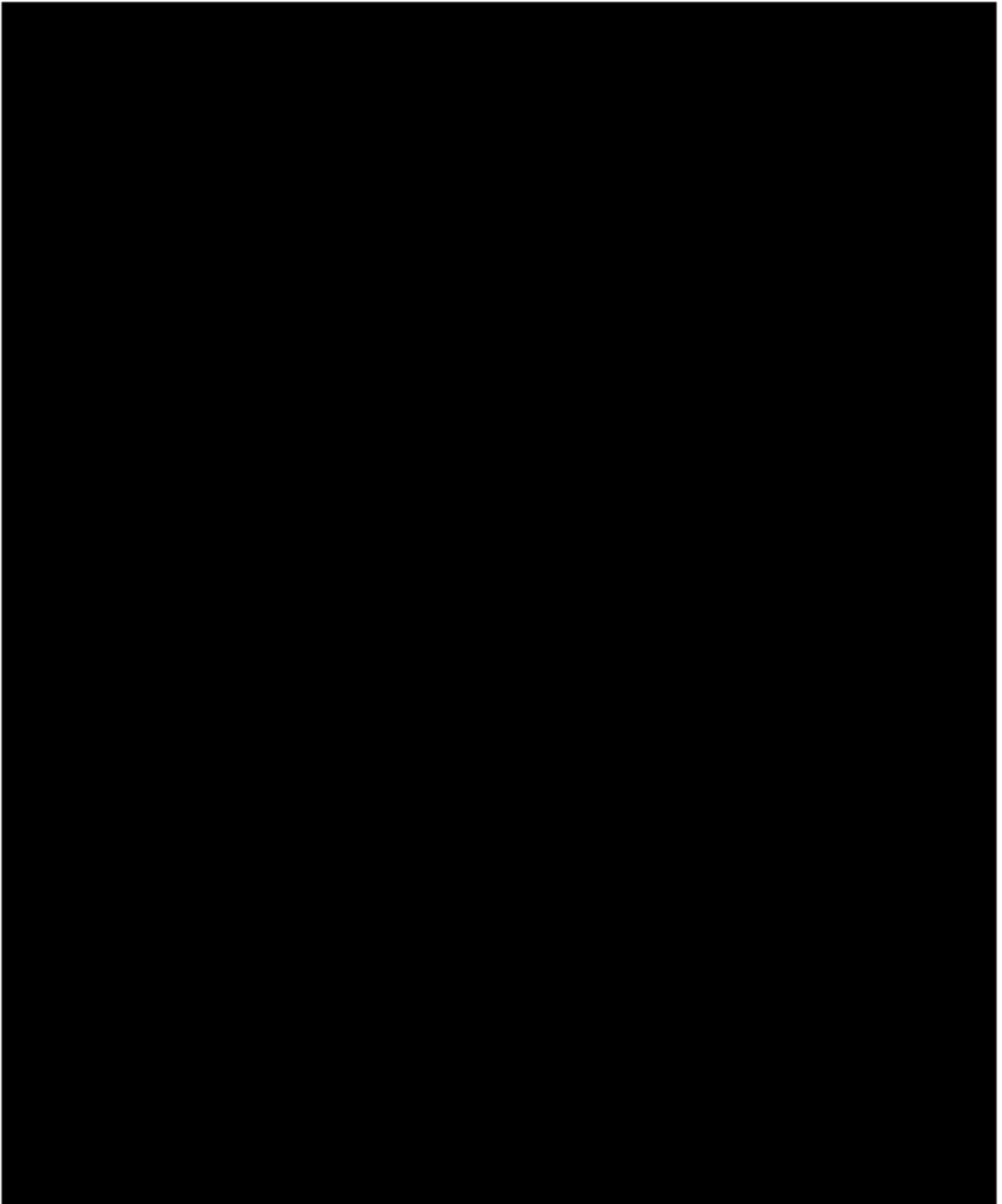
- Co-chairs noted a number of reporting requirements and announcements to occur prior to or on the December 9 anniversary of the PCF:
 - Reporting: e.g. Results.ca to post Clean Growth and Climate Change Charter and Investing In Canada Charter; annual progress report to First Ministers; synthesis report.
 - Announcements: e.g. Expert Institute, LCEF Challenge, carbon pricing.
- Need to identify full list of reporting and announcements; develop workplan and communications approach from now to holidays
- Need to do forward planning for next year, identifying actions, milestones, next steps, workplan to Dec 9, 2018.

→ **ACTION ITEM:** develop communications approach - to be on the November 29 agenda.

2.

•

•



The next DM meeting will take place on **November 29, 2017**.

Participants

PCO (cochair)	Christiane Fox, Deputy Minister
ECCC (cochair)	Stephen Lucas, Deputy Minister
AAFC	Tom Rosser, ADM Strategic Policy
ECCC	Matt Jones, ADM, PCFIO
	Vincent Ngan, DG, PCFIO
	Carolyn Crook, ED, PCFIO
	Tanuja Kulkarni, Manager, PCFIO
ECCC – Special Guests	Catherine Stewart, ADM, IAB
	Fred Beauregard-Tellier, ED, PCFIO
	John Moffet, A/Associate ADM, Environmental Protection Branch
FIN	Richard Botham, ADM, Economic Development and Corporate Finance
INAC	Stephen Van Dine, ADM Northern Affairs
INFC	Yazmine Laroche, ADM (tel)
ISED	Chris Johnstone, Senior Director, Clean Technology and Innovation and Jobs Branch
NRCAN	Christyne Tremblay, DM
	Andre Bernier, Senior Director, Renewable and Electrical Energy
PCO	Matt Lynch, Director of Operations, IGA
	Jay Barber, Senior Policy Officer, IGA
	Glenn Hargrove, Director of Operations
TC	Helena Borges, Associate DM
	Ellen Burack, DG, Environmental Policy
TBS	Jane Pearce, Assistant Secretary, Economic Sector
DFO	Nil
HC	Nil
PS	Nil
GAC	Nil



Treasury Board of Canada
Secrétariat

Secrétariat du Conseil du Trésor
du Canada

Canada

Clean Technology

Horizontal Business Innovation and Clean Technology Review

Agenda

1 Context

2 Phase II Data

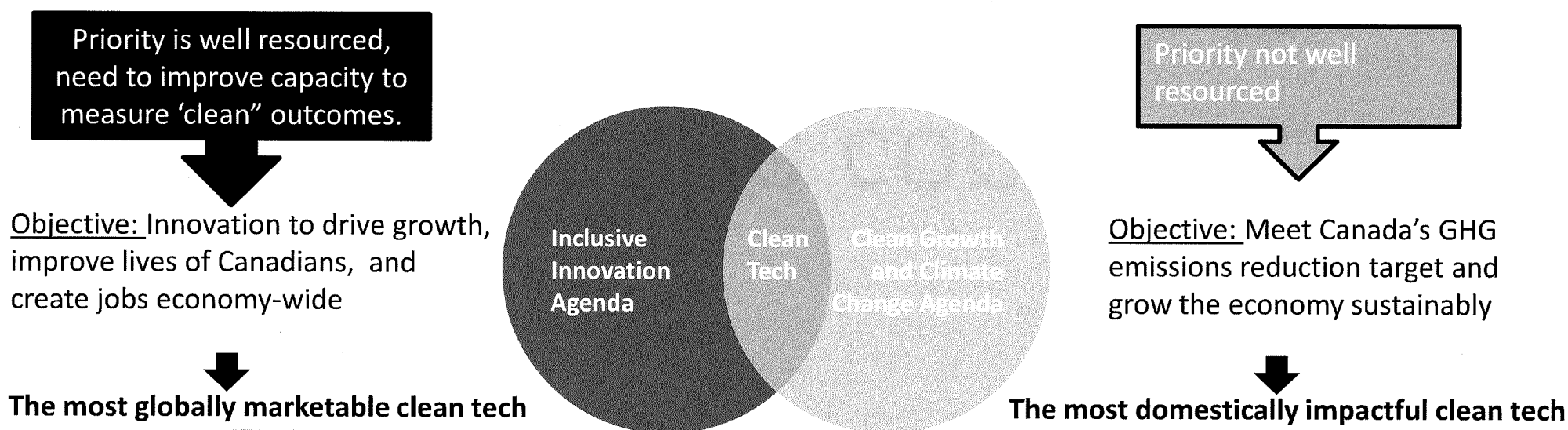
3 Expert Advice

4 Opportunities for immediate action

What is the context of Clean Technology in the review?

Clean technology innovation plays a key role in two major policy agendas

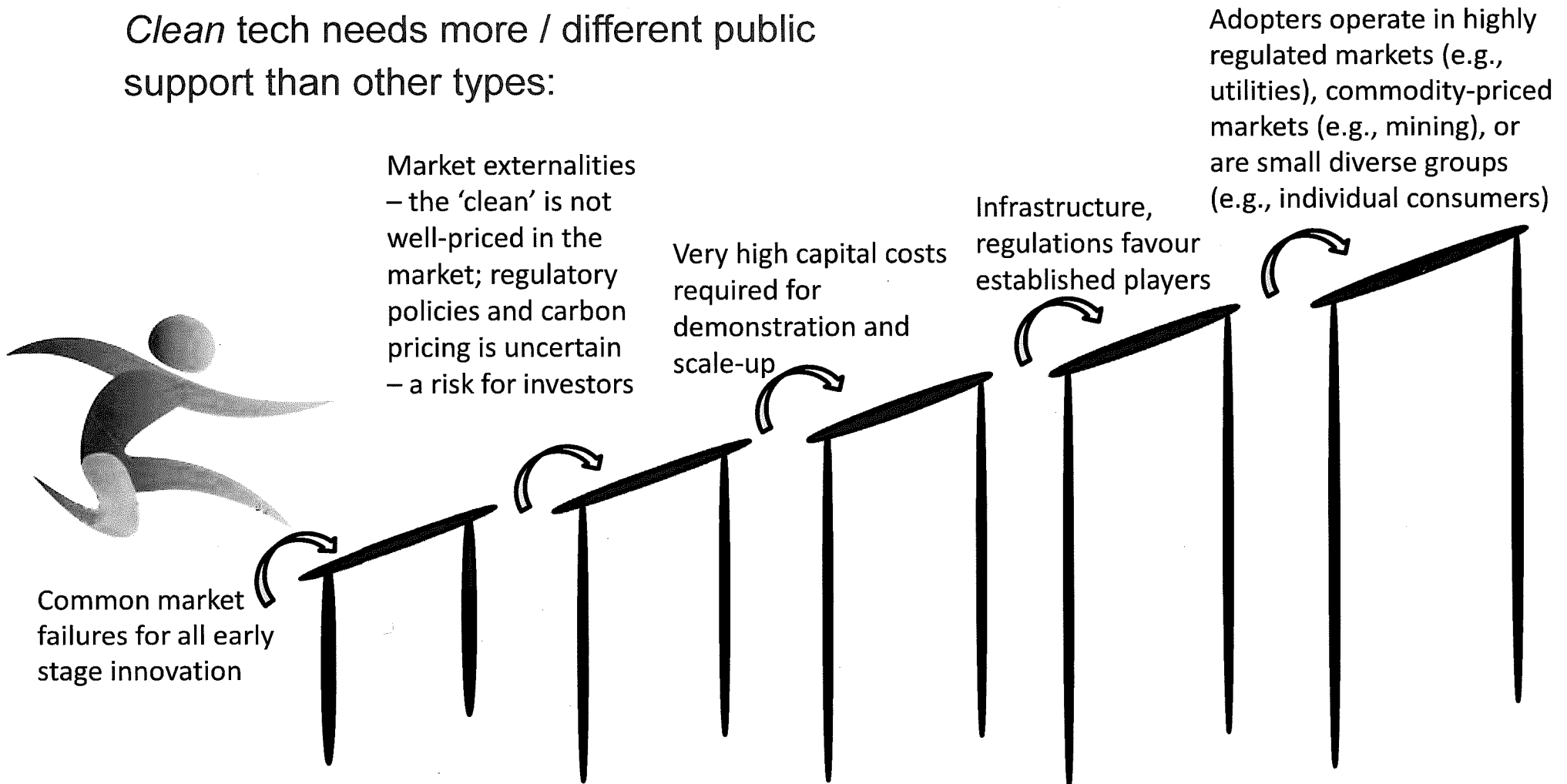
- Clean Technology: *any product, process, or service designed with the primary purpose of contributing to, remediating or preventing any type of environmental damage*
- What differentiates clean technology is the 'clean' – a positive impact in the environment



Clean Technology is a key element of two agendas, funding is targeting two different objectives

... but faces a significantly more challenging path to market than most other innovations.

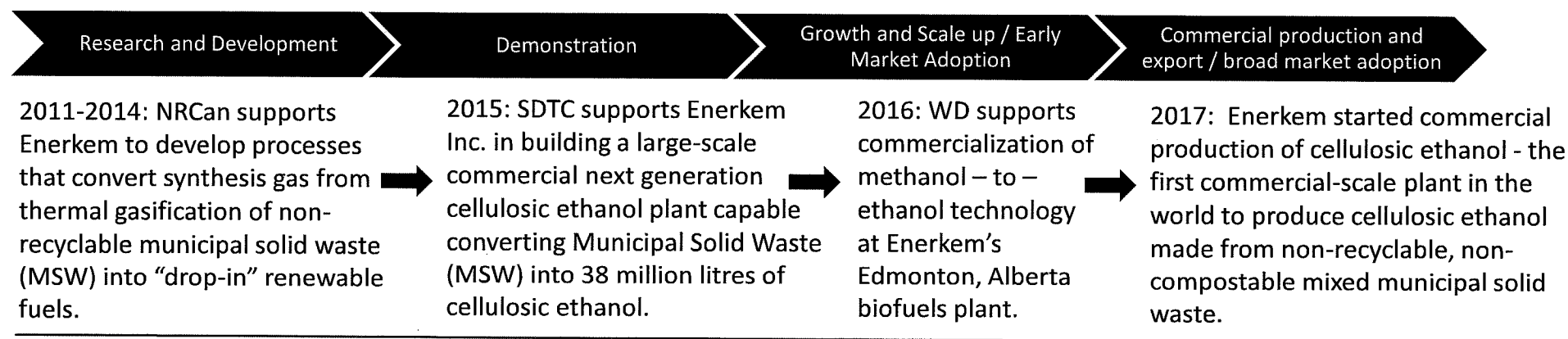
Clean tech needs more / different public support than other types:



'Clean' innovation happens in producer and adopter firms.

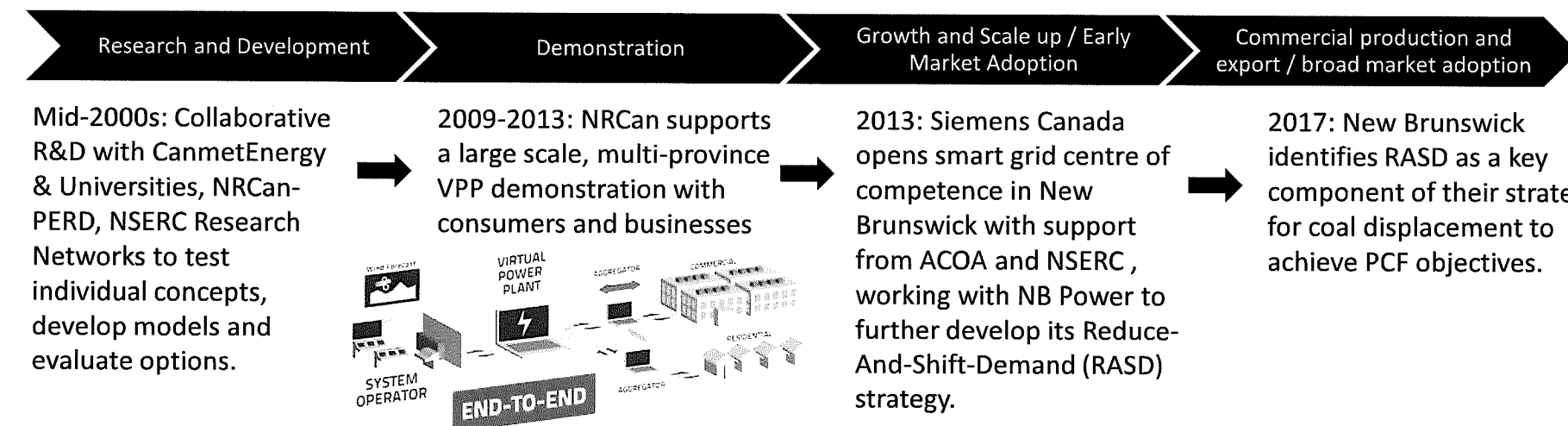
Producer-focused: A Canadian firm is developing a new clean technology for sale.

Example: Enerkem – Converting municipal solid waste into biofuels



Adopter-focused: A Canadian firm is looking to improve the environmental impact of operations.

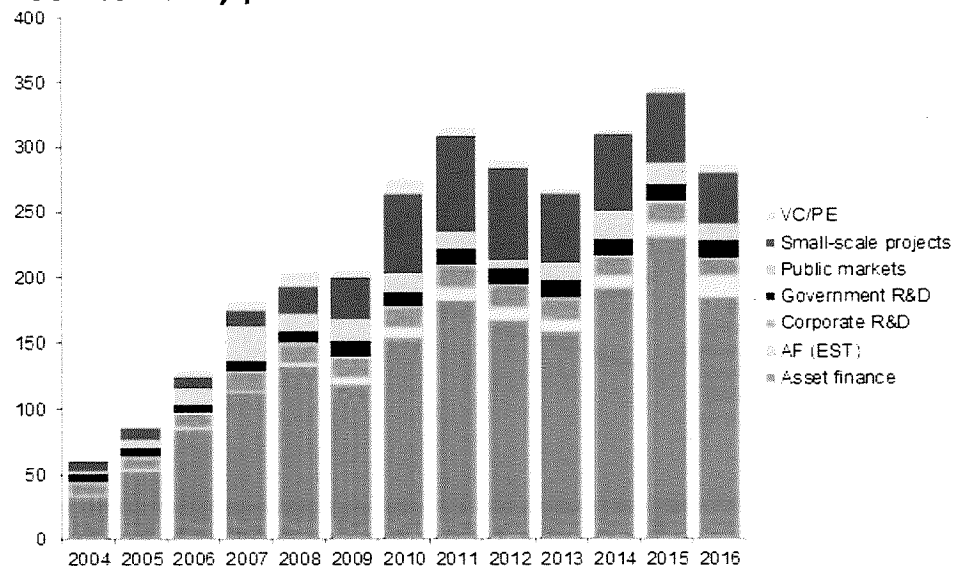
Example: New Brunswick Power's "PowerShift Atlantic" (PSA) - one of the world's first fully grid-integrated virtual power plants (VPP)



The Inclusive Innovation Agenda focuses on innovation to capture the global clean technology market opportunity ...

Budget 2017: the global market for **clean technology** (cleantech) has surpassed \$1 trillion per year and will continue to grow over the next decade. As the world increasingly seeks out more sustainable and renewable sources of energy, and new technologies to improve the quality of air and water, Canadian companies can lead the way. Our clean technology companies are well-positioned to compete and win in this large and growing global market.

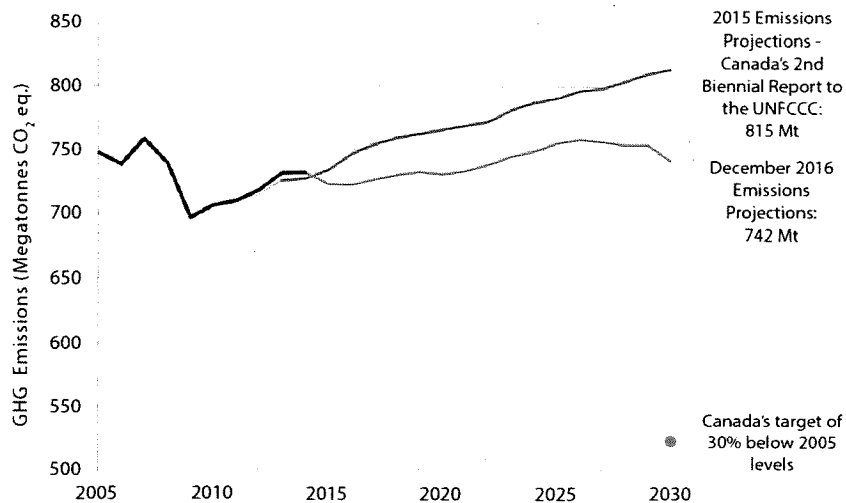
**Global new investment in clean energy by category,
2004 to 2016, \$bn**



Source: Bloomberg New Energy Finance.

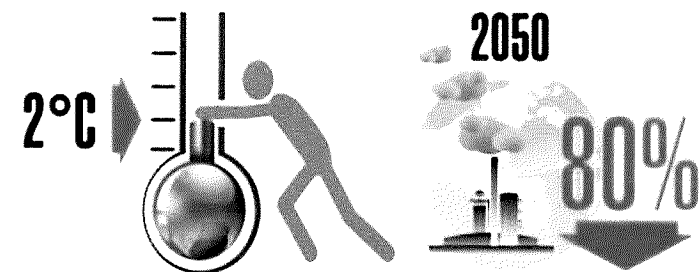
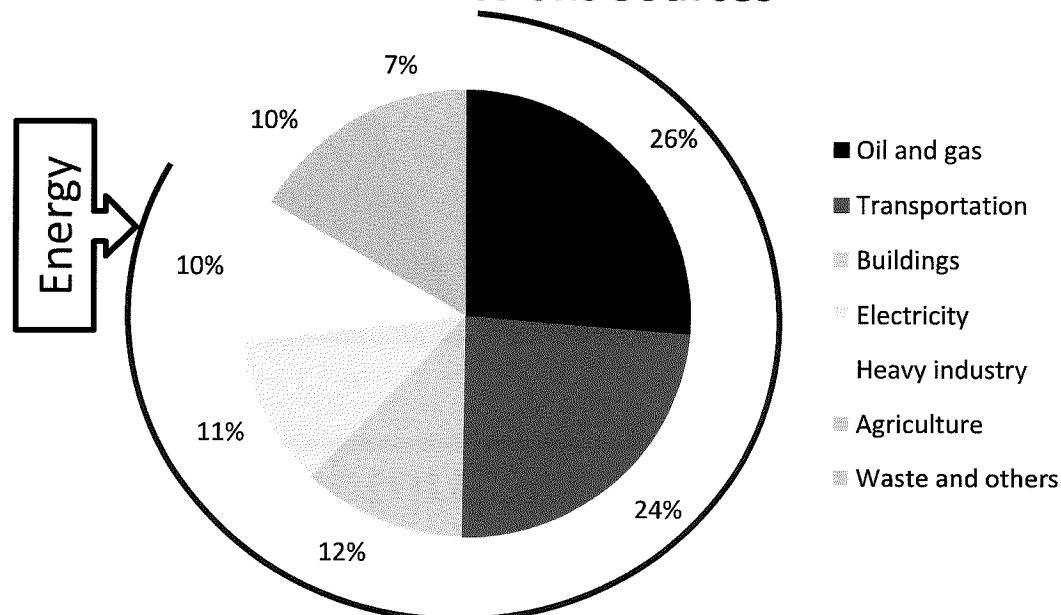
- Canadian companies can't rely on the domestic market alone - 83 % of companies expect to be exporting in 2015.
- In 2014, more than half the industry revenues came from exports.

... while the Clean Growth and Climate Change Agenda focuses on innovation to drive significant emissions reductions in Canada ...



- Energy, a key input in the economy, is responsible for 83% of GHGs with significant negative impacts on air, and water.
- Energy system needs to be transformed over the next 35 years
- Firms are deeply implicated in the process of transformation as both suppliers and users of energy

2015 GHG Emissions Sources



To limit global warming to 2°C, the world needs to reduce emissions from energy by 80% by 2050, and all countries need to essentially eliminate them by the end of the century.

Source: International Energy Agency

... but the two agendas reinforce each other –
each agenda's success strengthens the other.

Developing globally competitive clean technology companies:

- Increases the tool set for reducing Canada's emissions
- Increases expertise, skills and knowledge available in the market
- Establishes global reputation for strength in the sector

Inclusive Innovation Agenda

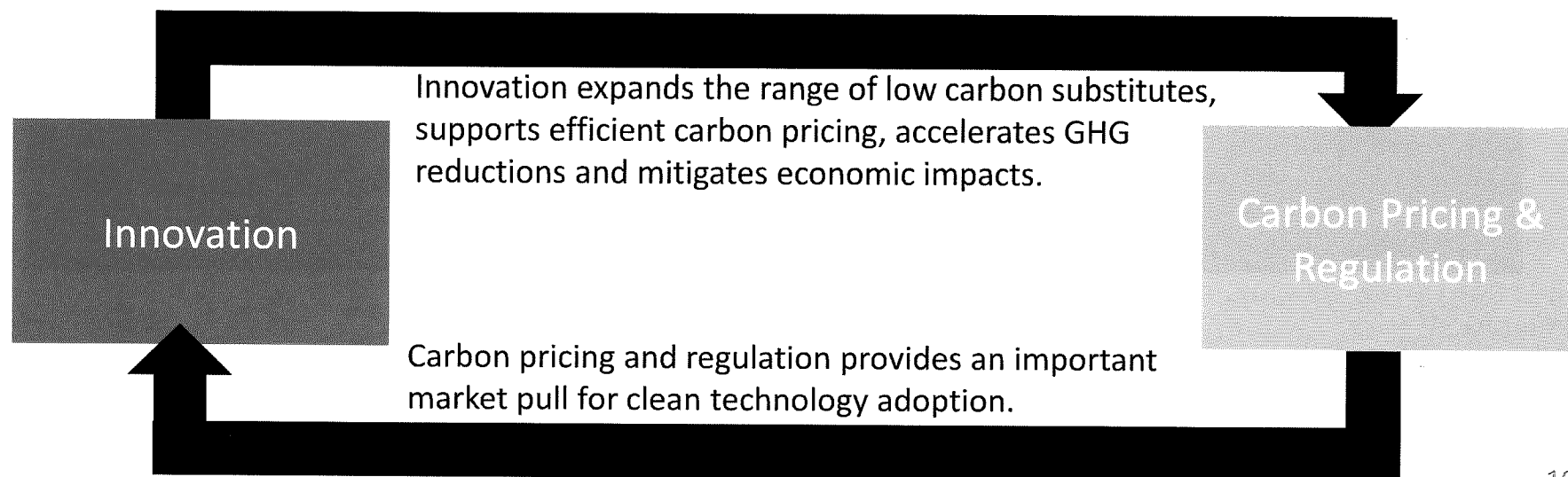
Clean Growth and Climate Change

Driving innovation in Canada to reduce GHGs:

- Strengthens the domestic market for clean technology producers
- Increases long term competitiveness of resource industries
- Lowers long-term cost of energy – important input to economy
- Establishes global reputation for strength in the sector
- Complements carbon pricing and reduces carbon leakage risk.

Regulations have a Significant Impact on Clean Technology

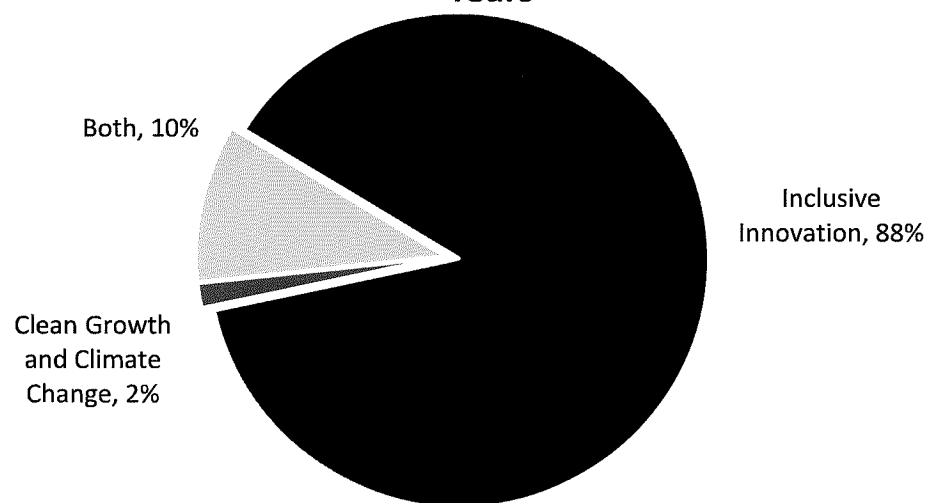
- Although not in the scope of this review, regulation will have a major impact on adoption of clean technology - the introduction of a carbon price in Canada, development of a Clean Fuel Standard and accelerating the phase-out of conventional coal-fired electricity by 2030 are key elements of Canada's emissions reduction strategy.
- Carbon pricing will increase the effectiveness of innovation programming in supporting emissions reductions by providing market pull.
- Innovation is required to succeed: the Deep Decarbonisation Pathways Project concluded that Canada requires 'next generation' technologies to achieve 50% of its total required abatement by 2050.



What does the Phase II Data tell us?

Alignment of Clean Technology Spending is Primarily to the Inclusive Innovation Agenda ...

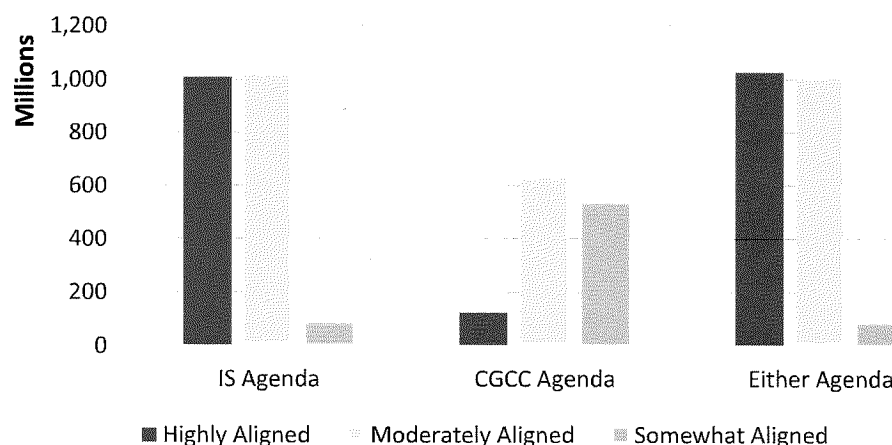
Investments in Highly Aligned Programs over 5 Years



- 98% of clean tech spending was rated as highly aligned to the Inclusive Innovation Agenda
- Only 12% was considered highly aligned to the clean growth and climate change agenda

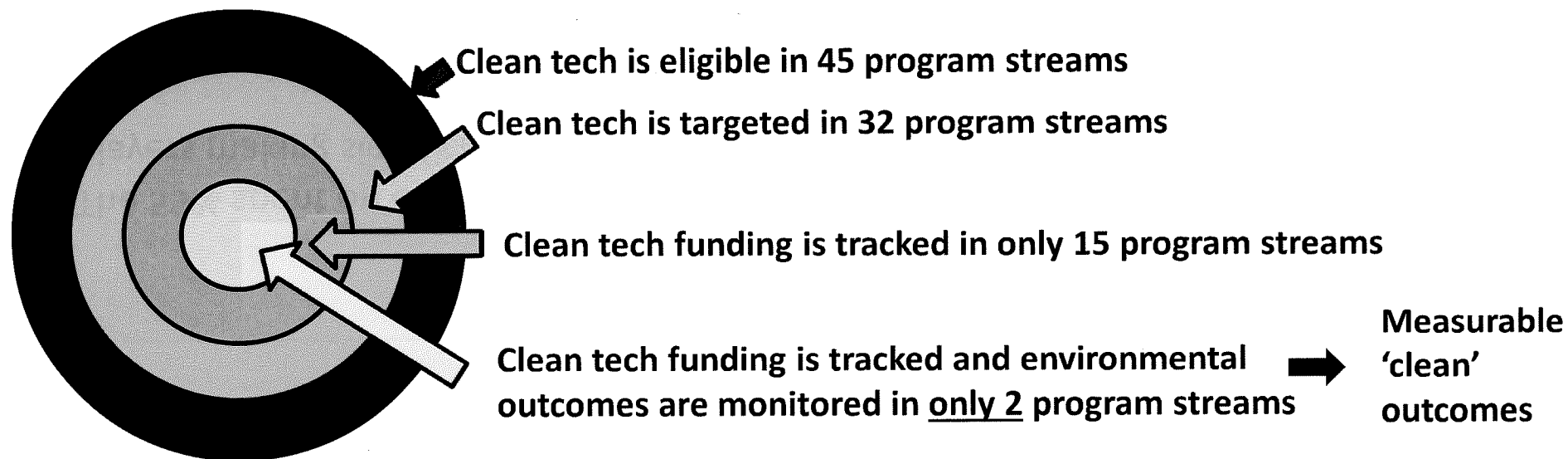
- Most clean technology innovation spending is targeting the producer-focused articulation of clean tech
- Environmental outcomes are only tracked in two programs - even 'moderately aligned' CGCC programs didn't monitor environmental outcomes (e.g., GHGs)

Overall Alignment Across Priorities



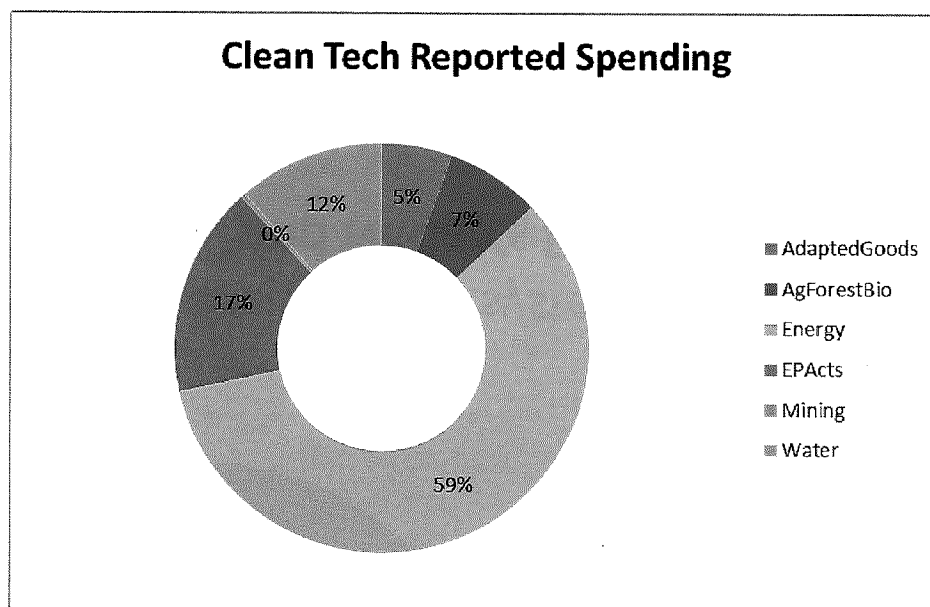
... with limited monitoring and reporting on 'clean' outcomes

Involvement of program streams in clean technology



- Low capacity in the system for monitoring and reporting on 'clean' – exceptions are SDTC and NRCan's Energy Innovation Program.
- "What gets measured gets done": Not tracking clean outcomes suggests less impact on the Clean Growth and Climate Change agenda.

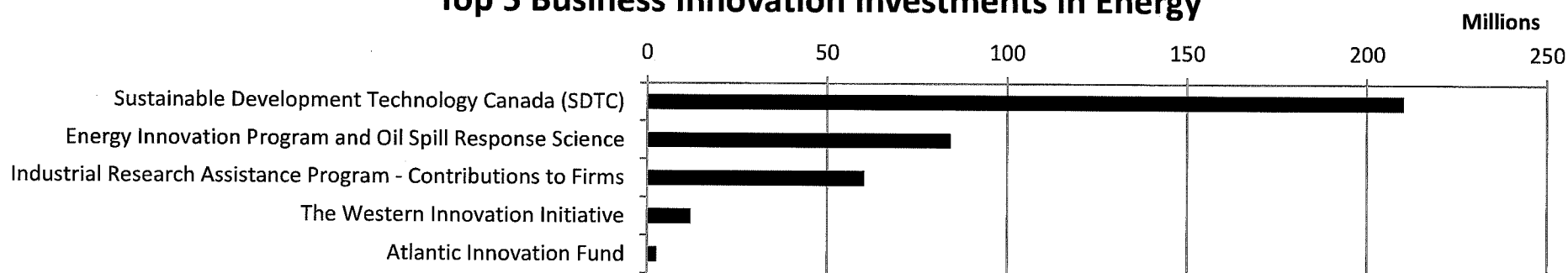
Investments by category suggests an underinvestment in energy ...



- At 83% of GHG emissions, energy represents only 59% of innovation investments.
- While other environmental outcomes are also important, transformational change is required in energy to achieve emissions reduction targets.
- Other notable gaps: mining, and agriculture

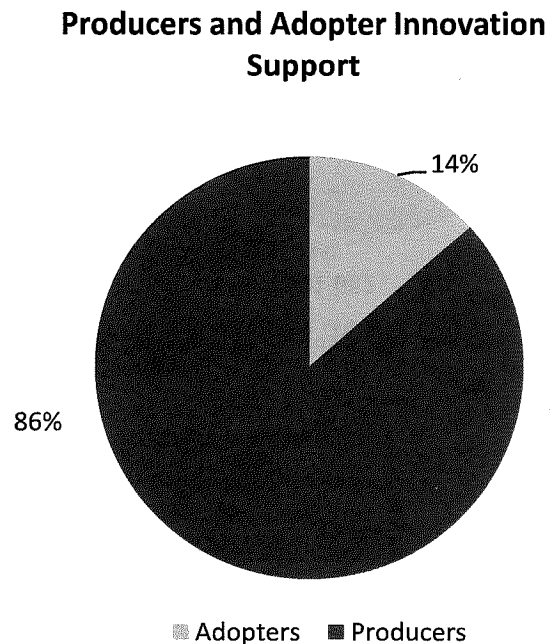
- The 59% spent on energy is scattered between 14 program streams, with a few larger players making significant investments

Top 5 Business Innovation Investments in Energy



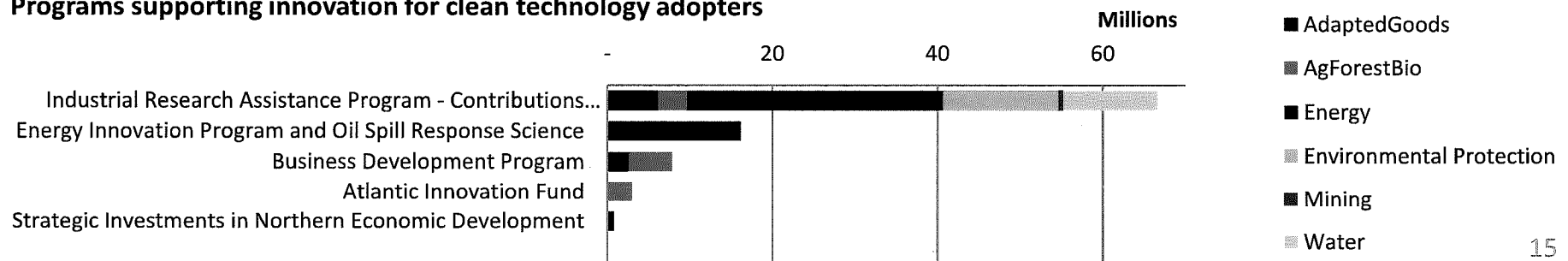
14

... and an underinvestment in support of adopter-led innovation ...



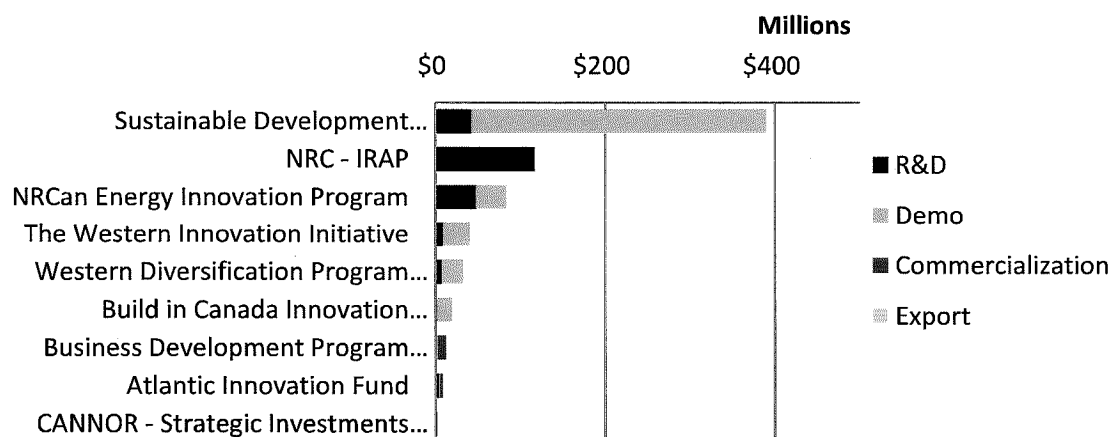
- Regulations impact adopters – carbon pricing impacts natural resources sectors in particular, which represent 16% of GDP, \$25B in government revenues, and 93% of GHG emissions.
- **Innovation reduces the negative impact of climate change policies on GDP in 2050 by half and significantly lowers the carbon price needed.**
(OECD Taxation, Innovation and Environment)
- **Canadian clean technology producers are responsible for only 1.6% of global clean technology** – Canadian firms may not meet a Canadian adopters innovation needs.

Programs supporting innovation for clean technology adopters



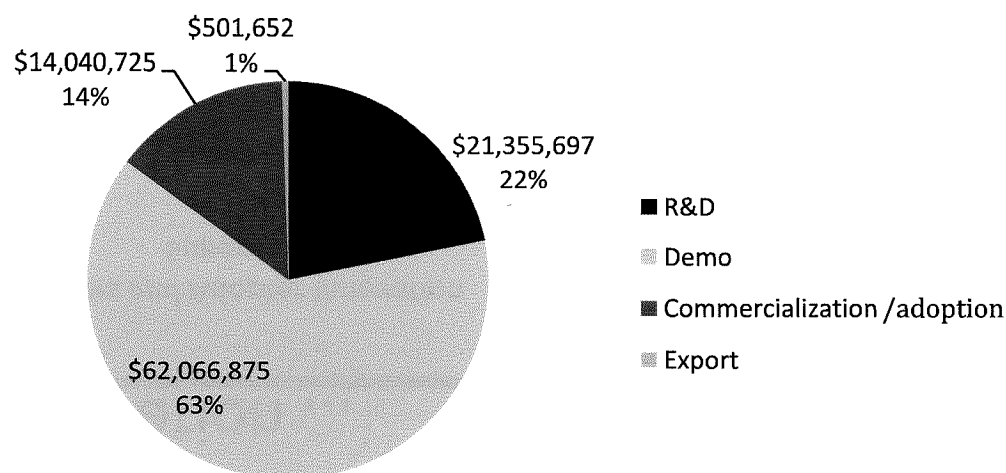
... with too many players concentrating in demonstration.

Reporting Clean Tech Spending by Stage of Innovation



- 85% of reported RDA funding is in RD&D.
- IRAP is funding early, small interventions in firms.
- SDTC is funding larger interventions in firms.
- SBDAs are funding medium to large interventions with a range of stakeholders (firms, non-profits, other government)

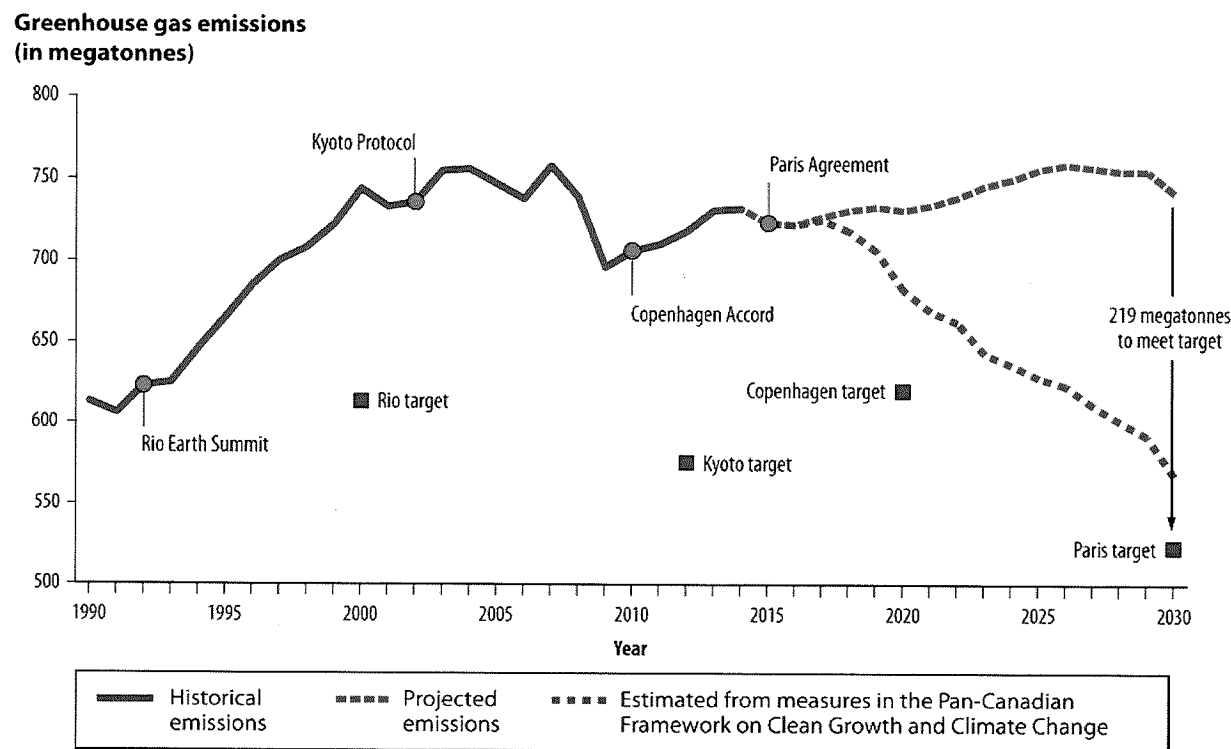
All RDA Clean Tech Spending Reported



- RDA funding would be better placed post-demonstration to support market adoption of clean technologies to support clean growth targets.
- This would move roughly \$85M from RD&D to adoption.

What did the experts tell us?

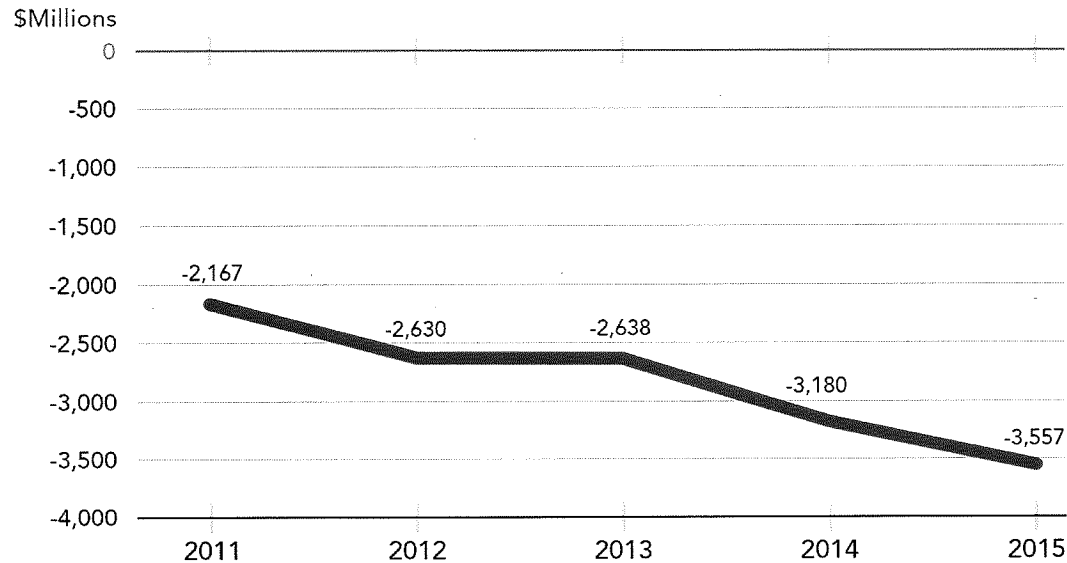
Previous approaches have not worked in achieving emissions reduction objectives ...



CESD 2017 Audit: “Over the past 25 years, the Government of Canada announced four federal commitments for reducing greenhouse gas emissions, as part of international agreements. With each commitment, the timeline for the federal government to meet its emission target was pushed further into the future”

... and it also hasn't worked for clean technology producers.

RETAINED EARNINGS, CANADIAN CLEAN TECHNOLOGY FIRMS, 2011-2015



Source: Statistics Canada. N=713

Source: Analytica Advisors

- Retained earnings for the industry have declined each year for the past five years.
- Firm-level financial data reveals a negative return on sales since 2011, most operate in unprofitable markets.
- Returns to shareholders even for mature firms remain below those of the lowest-risk investments in the economy.
- Markets for low-carbon innovation have yet to emerge.

Canada's clean-technology industry now includes 850+ technology companies, including many SMEs operating across Canada. (aerospace - 700, automotive - 450)

An integrated systems approach to key challenges is required.

Input from experts through a SSHRC literature review:

- Driving clean innovation requires more than just fixing market failures
- Must also address *system* failures and barriers
 - Overcome *incumbent technology lock-in* that impedes innovation uptake
 - Understand specific systems, target barriers, foster innovation
- Emerging research says governments don't just fix markets; *co-create and shape* them to achieve important *public missions* (e.g. low carbon)
 - Must 'tilt' the playing field (i.e. provide direction) towards 'clean'.

Growth has not only a rate, but also a direction – Mariana Mazzucato

Opportunities for immediate action

Improve the Federal Capacity to Deliver Clean Growth

A coordinated approach

Leverage the Clean Growth Hub to coordinate the system:

1. Build on existing strength (NRCan, IRAP, SDTC) to improve capacity in the system – setting outcomes, scoping, selection and due diligence, measuring results. Identify methods of assessing program impact and effectiveness for 'clean' outcomes.
2. Support for warm hand-offs, and no-wrong-door approach.
3. Develop evidence-based analysis to support program-level decision-making

To address gaps on the clean growth and climate change

4. Strengthen focus on adopter innovation

- Adopter-focused innovation through Clean Growth program suite (NRCan, AAFC and DFO)
- Retarget RDAs to post-demo adoption, growth and scale-up.

5. Increase focus on energy

- System-focused energy programming through Energy Innovation Program
- 'Breakthrough' Energy – collaboration between NRC, NRCan and ECCC.

To address gaps on the Inclusive Innovation Agenda

6. Increase capacity for clean

- Strengthen outcomes and targets for clean technology and improve capacity to track spending and measure environmental and economic results.
- Greater sharing of market intelligence.

7. Address the post-demo gap

- Create a smoother path from demonstration to commercialization - address the gap between SDTC and BDC, particularly for high capex clean tech, 'crowd-in' funding.

Recommendation 1: Measure and Monitor 'Clean'

- Both the CESD audit and Phase II data tell us that capacity is weak in the federal system to define outcomes, set targets, measure and monitor environmental impacts.
- Existing strength in the system should be leveraged to provide guidance and best practices through the clean tech hub.

Measuring and Monitoring 'Clean'

NRCan and SDTC set 'clean' outcomes and monitor results. They represent only 12% of clean technology spending.

17 program streams target clean technology without tracking spending in the area.

Not all 'clean' is equal: right now, it is not clear what is being funded.

Specific Actions

ECCC, NRCan, AAFC, ISED to develop consistent clean outcomes and measurement methods for clean technology innovation programs.

Clean Growth Hub to monitor implementation of clean outcomes across programs funding clean technology.

ECCC, NRCan, ISED and Statistics Canada to develop a strategy for evaluating program impacts against PCF objectives through data or modelling.

Recommendation 2: Improve Horizontal Coordination

- Particularly for SMEs, navigating a path from basic research (NSERC?) through to early R&D (IRAP?) later R&D and demonstration (SDTC, NRCan, AAFC, RDAs?), market adoption (BDC, RDAs, IRAP?) and export (EDC, GAC, IRAP?) is complex.
- Increased coordination in project selection and due diligence to facilitated warm hand-offs between programs will help ensure that high quality opportunities advance.

Improve Horizontal Coordination

Clean technology is currently eligible in 45 program streams across 11 organizations.

IRAP tends to be the 'first door' for new SMEs. Resource industry firms usually approach NRCan. AAFC is a first point of contact for the agriculture industry.

Coordination will increase overall effectiveness.

Specific Actions

All programs implement provisions to allow sharing of basic applicant and project information in selection and due diligence.

All programs to coordinate through the Clean Growth Hub to support warm hand-offs of firms and a no-wrong-door service.

TBS and Finance to review program resourcing of clean technology focused programs to ensure sufficient resources are available to support horizontal coordination.

Recommendation 3: Coordinated, Strategic Decisions

- Individual programs make implicit decisions in design, scoping and selection on the priority of different environmental and economic impacts and opportunities.
- There is no clear guidance to support decisions by programs – the resulting allocation of federal investments is the sum of hundreds of individual decisions.

A Coordinated, Strategic Approach

Programs funding clean technology have different levels and types of information to support decision-making – no overarching strategy guides the overall federal investment in the pursuit of clean technology for either economic or environmental outcomes.

The cumulative impact of these decisions from research through to adoption is not monitored, or measured or attributed.

Specific Actions

The clean growth hub should identify an approach to support strategic coordination of Canada's clean tech investments.

ECCC to develop evidence-based analysis and targets to support decisions on competing environmental objectives and investment targets.

ISED, NRCan, AgCan to identify a method for better sharing of market intelligence and opportunities, and the development of sector specific strategies.

Recommendation 4: Strengthen Focus on Adopter Innovation

- Tight timeframe to achieve 2030 emissions reductions - current measures are estimated to be insufficient to meet Paris target – 2050 targets are more aggressive.
- Regulation without innovation will drive up costs of resources (energy, minerals, agricultural goods) since most emissions happen there. R&D and government procurement are important complements to carbon pricing.
- Key export market for Canadian goods is the United States – Canada needs to remain competitive to realize Inclusive Innovation Agenda goals.

Strengthen Focus on Adopters	Specific Actions
Budget 2016 committed \$2.1 billion over five years to reduce emissions and improve the greening of government operations.	Recognizing the need for further innovation to 2050, make the Clean Growth in the Natural Resources Sector program ongoing.
Budget 2017 announced \$200M for Clean Growth in the Natural Resources Sector – an adopter focused innovation program delivered in collaboration with provinces. The program builds on existing expertise to deliver on ‘clean’ outcomes through programming that is strongly aligned, effectively managed and horizontally coordinated.	Use procurement approaches to demonstrate federal leadership as a first customer for promising Canadian clean tech to green government operations.
	Reposition regional economic development agencies to post-demonstration, support broader market adoption of proven clean technologies.

Recommendation 5: Strengthen Focus on Energy

- Energy accounts for 83% of GHG emissions, and also has significant impacts on water, soil and wildlife – a key target for clean growth.
- Investments in energy clean tech can be incremental (e.g., slightly more efficient diesel engines), transformative (e.g., electric vehicles) or breakthrough (e.g., fusion) – transformative and breakthrough are needed.
- Energy is a highly complex, heavily regulated system – significant expertise is required to effectively target interventions.

Strengthen Focus on Energy

NRCan-EIP takes a system focus to energy, supporting producers and adopters to 'tilt the system' in favour of clean energy transformation, supported by close integration with science and policy.

NRC-IRAPs departmental corporation model has a flexible human resources structure that would enable an ARPA-E like model to support breakthrough innovations.

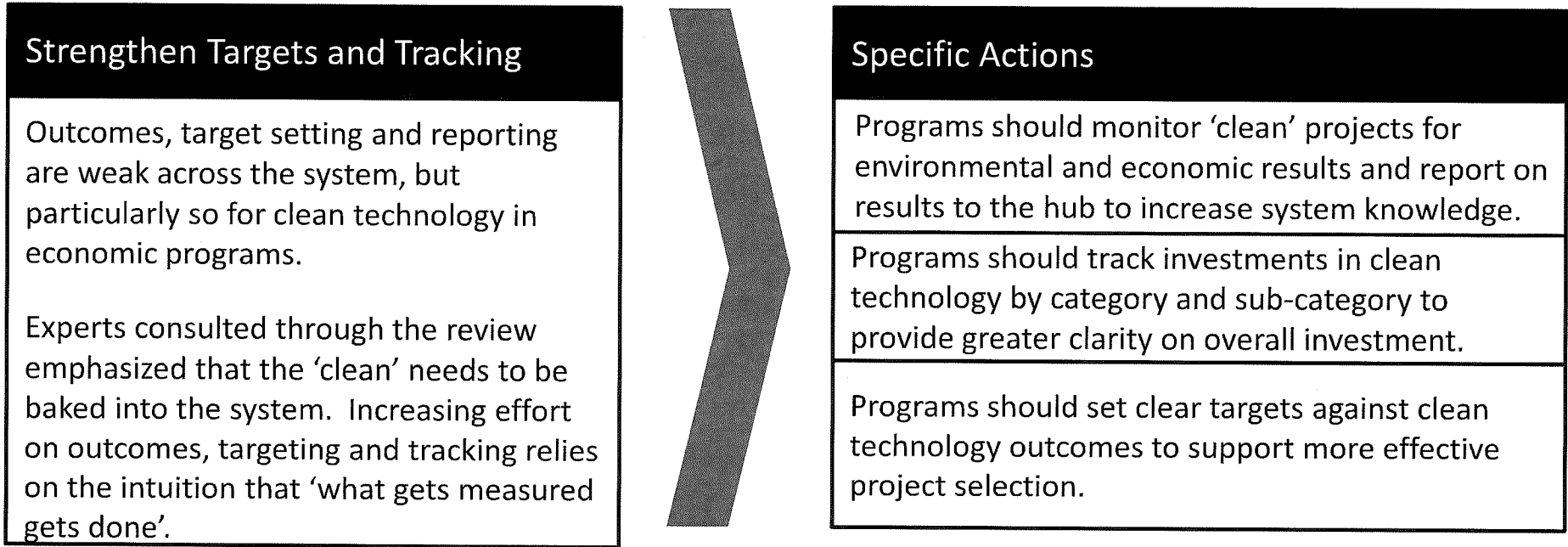
Specific Actions

Increase investment in the core Energy Innovation program envelope to include annual funding levels currently funded under Green Infrastructure, to support ongoing delivery of PCF goals through transformative energy technologies.

Create a Clean Energy Breakthrough Office, built on the NRC platform with horizontal governance from NRCan and ECCC to support breakthrough energy technology.

Recommendation 6: Strengthen Targets in Economic Programs

- Clean technology is a significant global market – Canadian clean technology exports will produce economic and environmental benefits.
- Supporting clean technology producers in measuring their performance on ‘clean’ outcomes will help them in marketing their offerings internationally.
- The bulk of investments in clean technology are being made under the Inclusive Innovation Agenda – understanding the economic and environmental results of these programs is important for effective decision making.



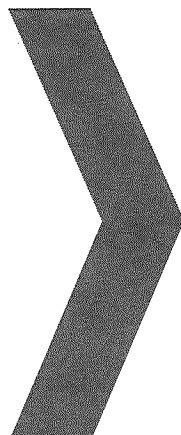
Recommendation 7: Support for growth and scale-up

- There is a financing challenge for clean technology firms between completion of a demonstration and the ability to obtain growth and scale-up capital. This gap is particularly pronounced for technologies with high capital costs.
- A range of options have been suggested including loan guarantees or insurance through crown corporations and federal programs .
- Given the high cost of growth and scale-up in clean tech, a solution needs to have the following properties:
 - Government only pays for incremental risk & externalities – requires high expertise.
 - Room for many different funders, i.e., crowding in, non-conventional lenders.
 - Ability to identify technologies that will ultimately be successful in the market for patient lenders.
 - Ability to advise firms, credibility to help firms attract lenders.

Support for Growth and Scale Up

Demonstration support to TRL 9 involves a single demonstration, at scale and in context.

Commercialization and scale-up can require hundreds of millions in investment on the strength of that demo.



Specific Actions

Clean Growth Hub to develop options for addressing promising high capex technologies to support them through growth and scale-up to reach global markets, ensuring a smooth transition from demonstration programs to crown corporation supports.

**DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE
PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE**

CLEAN GROWTH HUB

PURPOSE

To provide an update on the Hub, a whole-of-government focal point for clean technology within Innovation Canada, focused on supporting companies and projects, coordinating programs, including the \$2.3B invested in clean technology through Budget 2017, and tracking results. The Hub is co-led by ISED and NRCan.

A primary function of the Hub is to assist stakeholders in navigating the federal supports available for clean technology and to share information across departments to enable an integrated approach to key projects. The Hub does not administer funding nor replace the assessment and decision-making processes of individual programs.

CURRENT INITIATIVE STATUS

- The Hub is ramping up operations as it prepares for an official Ministerial launch.
- In its pre-launch phase, the Hub has met with over 100 clean tech proponents.
- Current Hub members include ISED, NRCan, GAC, AAFC, DFO, ECCC, TC, NRC and TBS-GGO. SDTC and BDC to participate starting in January.
- The Hub is providing guidance to Supercluster applicants who were not shortlisted and reviewing clean technology-related Low Carbon Economy Fund and Strategic Innovation Fund proposals.

CONSIDERATIONS/RISKS

- As clean technology spans the mandates of multiple departments, ongoing efforts are needed to coordinate stakeholder engagement and messaging. The Hub can be leveraged to achieve this coordination.
- The Hub also provides a mechanism to receive direct, real-time feedback from stakeholders on the effectiveness of programs. This input could be harnessed to promote an adaptive approach to program delivery.
- The TBS Horizontal Business Innovation and Clean Technology Review has identified a strong role for the Hub, both to coordinate programs and to improve reporting of environmental, economic and jobs metrics.
- Hub communications activities must be strategic to reach key clean technology producers and end-users, ensure stakeholder expectations are appropriate, avoid an unmanageable initial volume of inquiries, and effectively convey the value of the organization.

MILESTONES/CRITICAL PATH

- Mid-Dec. 2017: Move into final space (CD Howe Building Commercial Level)
- Jan. 2018 (TBD): Official Hub Launch
- Jan. to Mar. 2018: Post-launch stakeholder outreach, including regional visits
- Mar. 2018: GLOBE Conference (Vancouver)

NEXT STEPS and KEY DECISION POINTS

The Hub is focussed on pre-launch priorities: (1) finalizing communications materials, including website; (2) moving to final space; (3) developing client management/triage processes; (4) launching efforts to improve administrative data collection (e.g., program data); and (5) ensuring the full team is in place with protocols established for collaborative work across departments and programs.

Seeking Committee input on launch considerations, progress to date and key opportunities for the Hub to support interdepartmental coordination.



Clean Growth Hub

**Update to the Deputy Ministers Oversight
Committee of the PCF – November 29, 2017**

Canada

Background

- Stakeholders have consistently called for easier access to, and better coordination of, federal supports for clean technology.
- Under the **PCF** process, the FPT Working Group on Clean Technology, Innovation and Jobs proposed *“Clean Growth Innovation Hubs...to improve coordination and sharing of data and best practices.”*
- Budget 2017:
 - Invested \$2.3B in dedicated clean technology initiatives, and identified clean tech as one of six target areas under the **Innovation and Skills Plan**
 - Included **Clean Growth Hub** within Innovation Canada to *“streamline client services, improve federal program coordination, enable tracking and reporting on clean technology results across government, and connect stakeholders to international markets.”*

Planned Activities

1) Supporting companies & projects

Provide coordinated guidance to clean tech proponents on best suited **funding/financing mechanisms**, connections to **export assistance** and **regulatory** and **procurement support**.

Convene depts/agencies for coordinated evaluation of proposals to reduce duplication and speed decisions.

2) Coordinating programs

Provide a portfolio view of clean technology investments, allowing real-time monitoring of activities and their **alignment with key priorities**.

Identify **gaps** in program delivery and mechanisms for **improved collaboration** between initiatives and with **partners** (e.g., PTs).

3) Tracking results

Collect data across initiatives, working with RDUs to **coordinate metrics** through common definitions for economic and environmental impacts; and create a central database.

Consolidate results (e.g., what is the overall impact of the \$2.3B investment?)

Co-located staff from various depts/agencies overseen by co-Directors from ISED and NRCan, and guided by DG and ADM Steering Committees

Progress to Date

➤ Pre-launch, engaged with over 100 companies

- Using interactions to refine approach

➤ 8 departments and agencies now have staff in co-located space

- ISED, NRCan, AAFC, DFO, ECCC, TC, NRC and TBS-GGO
- BDC and SDTC will have staff in January
- GAC identifying Hub representative

➤ Interdepartmental charter and initial protocols in place

- E.g., triage strategy, client waivers for Hub to share information across members

➤ Already facilitating sharing of due-diligence and cross-referrals between initiatives

- E.g., Superclusters proposals with clean tech aspects being off-ramped to other programs

“The move to build in an expeditor/connector role in the form of the Hub is a bold and very private-sector focused move... we really appreciate your efforts here.”

– *Pre-launch client company*

Next Steps

➤ **Pre-launch:**

- **Operations:** Finalize client management processes and implement more robust tracking systems
- **Space:** Move into dedicated office space (commercial level of C.D. Howe Building) – Anticipated Dec. 11, 2017

➤ **Ministerial launch / website** targeted for January 2018 – TBC

- Broader communications strategy being finalized

➤ **Post-launch work plan**

- Interfaces with procurement, Invest in Canada Hub, Climate Finance Office
- Links to provinces and territories and external partners
- Strengthen connections with regional staff
- Shift to proactive outreach

DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

First Annual Synthesis Report to First Ministers on the Status and Implementation of the PCF

Presented by: Jean-Marie Huddleston, Director, FTP Engagement and Reporting, PCFIO

Objective

- To provide a summary of the Pan-Canadian Framework (PCF) First Annual Synthesis Report on the Status of Implementation (for information).

Context/Current Status

- In the PCF, First Ministers directed FPT governments to report annually to Canadians and to First Ministers on progress achieved.
- This first annual synthesis report summarizes progress made in 2017 to implement the PCF.
- The structure of the synthesis report follows that of the PCF and provides:
 - An overview of progress on each of the four pillars of the PCF, including early actions underway and key accomplishments to date, with flagship actions by individual jurisdictions highlighted throughout;
 - An overview of the status of reporting and oversight mechanisms;
 - Highlights of expected actions and areas of work for the year ahead; and
 - An annex listing all PCF actions undertaken/initiated in 2017 by all jurisdictions.
- The synthesis report states that FPT governments have made good progress in starting to put the PCF into action. Actions taken this year include work to establish carbon pricing systems, funding announcements, drafting and consultation of new regulations, launch of new programs and policies, and establishment of governance, reporting and oversight structures.
- Future efforts will include continued work to implement carbon pricing systems across Canada in 2018, as well as to develop and finalize a variety of regulations, policies, and programs. This work will include pan-Canadian collaboration on electricity interconnections, building codes, and a zero-emissions vehicle strategy, as well as support for adaptation, finalizing green infrastructure investments, deepening engagement on clean technology innovation and ensuring effective implementation of clean technology investments and initiatives.

Considerations/Risks

- This report provides a status update on the implementation of the PCF. Subsequent reports will include reporting on concrete results and outcomes, including through the use of indicators and metrics. Future reports will also identify policy gaps and opportunities, and will provide recommendations on new or expanded areas of work to address them.
- The Synthesis Report was drafted by the FPT Coordinating Committee of Experts, drawing on the progress reports of 7 ministerial tables (environment, energy, agriculture, forestry, infrastructure, transportation, and innovation).
- The Synthesis Report will be a public document, and will be released on the first anniversary of the PCF (December 9th), following transmittal to First Ministers.

- The draft report has been shared with National Indigenous Organizations.

Recommendation/Options (for decision items only)

- NA

Next Steps / Critical Path / Milestones

- A final draft of the synthesis report was provided to Deputy Ministers of Intergovernmental Affairs with a deadline of November 24th for redline comments and approval.
- The report will be provided to First Ministers prior to its public release on December 9th, potentially via a letter co-signed by PCO and a PT (TBC)

Key Decision Points

- NA

Supporting Documents

- A final draft of the Pan-Canadian Framework First Annual Synthesis Report on the Status of Implementation (in both languages).

PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

FIRST ANNUAL SYNTHESIS REPORT ON THE STATUS OF IMPLEMENTATION

CONTENTS

EXECUTIVE SUMMARY	4
1 Introduction	6
2 Pricing Carbon Pollution	7
3 Complementary actions to reduce emissions	9
3.1 Electricity	9
3.2 Built environment	10
3.3 Transportation	11
3.4 Industry	12
3.5 Forestry, agriculture, and waste	12
3.6 Government leadership	13
3.7 International leadership	13
4 Adaptation and Climate Resilience	14
4.1 Translating scientific information and Traditional Knowledge into action	15
4.2 Building climate resilience through infrastructure	16
4.3 Protecting and improving human health and well-being	16
4.4 Supporting particularly vulnerable regions	17
4.5 Reducing climate-related hazards and disaster risks	18
5 Clean Technology, Innovation and Jobs	18
5.1 Building early-stage innovation	19
5.2 Accelerating commercialization and growth	19
5.3 Fostering adoption	20
5.4 Strengthening collaboration and metrics for success	21
6 Reporting and Oversight	21
Measurement and reporting on emissions	21
Reporting on implementation	22
Analysis and advice	22
Review	22
Commitment to continue to engage and partner with Indigenous Peoples	23
7 Looking Ahead	23
Pricing Carbon Pollution	23
Complementary actions to reduce emissions	23
Adaptation and resilience	24
Clean technology, innovation and jobs	25
Annex I: Status of all Pan-Canadian Framework Actions	25

Pricing Carbon Pollution	25
Mitigation	27
Adaptation and Climate Resilience	35
Clean Technology, innovation and jobs	38
Cross-cutting.....	42

DRAFT

EXECUTIVE SUMMARY

In response to the critical and urgent need to take action on climate change, Canada's First Ministers¹ adopted the Pan-Canadian Framework on Clean Growth and Climate Change on December 9th, 2016. This collaborative plan aims to reduce emissions, build resilience to a changing climate and enable sustainable economic growth. The Pan-Canadian Framework includes more than fifty concrete policy actions spanning the country and all sectors of the economy.

First Ministers directed federal, provincial, and territorial governments to work together and with meaningful involvement of Indigenous Peoples to implement the Pan-Canadian Framework and report back on progress. Given the breadth of the Framework, responsibility for putting it into action cuts across multiple government portfolios, and implicates Ministers responsible for environment, energy, infrastructure, transportation, forestry, agriculture, innovation, emergency management, and finance. This report summarizes the collaborative progress achieved across these nine areas and others, such as protecting human health.

Federal, provincial, and territorial governments are engaging and partnering with Indigenous Peoples as actions are implemented. In addition, in order to provide a structured, collaborative approach for ongoing engagement with Indigenous Peoples, the Government of Canada is collaborating with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation and partnership.

Summary of Progress

In the first year of implementation, federal, provincial, and territorial governments have made good progress in starting to put the Pan-Canadian Framework into action. Funding has been mobilized to support many of the new actions included in the Framework, including significant transfers from federal to provincial and territorial governments, as well as to representatives of Indigenous Peoples and governments. New regulations have been drafted and consulted on, and new policies and programs are being established and implemented in all jurisdictions. Governance, reporting and oversight structures have been established to track overall progress nationally and ensure success.

Work is underway to ensure **carbon pricing** applies across Canada. Some jurisdictions already have carbon pricing systems in place, while others are working to develop and implement pricing systems. In jurisdictions that do not implement a system that meets the federal benchmark, a carbon pricing backstop will apply.

Governments have made significant progress implementing **complementary measures to reduce emissions** across the economy. These include regulations – such as phasing out coal-fired power generation by 2030, reducing methane emissions from the oil and gas sector, continuing to improve the emissions performance of vehicles, and introducing a clean fuel standard. They also include work to develop and adopt increasingly stringent building codes to reduce energy use, as well as work to accelerate the uptake of zero emissions vehicles. These and other actions cut across all sectors of the economy, with the aim of reducing emissions or increasing carbon storage. New funding will support these mitigation activities, such as investments in clean and renewable power generation.

Actions are underway to advance **adaptation** efforts and build resilience to the impacts of the changing climate. This includes significant new infrastructure investments, including a \$2 billion cost-shared Disaster Mitigation and Adaptation Fund, and new actions being undertaken by jurisdictions to address flood risks exacerbated by climate change. New programs are being established that will help protect human health and vulnerable regions from climate change impacts, including programs that support healthy Indigenous communities. Codes and standards to support climate resilience are under development and efforts have been advanced to build regional capacity for adaptation action across all the priority areas identified in the Pan-Canadian Framework.

Governments are working to make Canada a leader in the global clean economy through a variety of actions focused on **clean technology, innovation, and jobs**. This includes work to create a strong pipeline of clean

¹ To note, Saskatchewan and Manitoba decided not to adopt the Pan-Canadian Framework.

technology ideas while positioning Canada's energy, mining, forest and agriculture sectors as leaders in the new resource economy. Federal, provincial and territorial governments are working together to enable access to capital for clean technology firms to help them develop and demonstrate the commercial viability of their new clean technology products. Programs are also being implemented to foster technology adoption through government procurement to support a strong domestic clean technology market. A federal Clean Growth Hub has been established to streamline government support for clean technology producers. Governments are also working together on a clean technology data strategy.

Looking Ahead

As federal, provincial, and territorial governments implement this Framework, they will continue to respect the rights of Indigenous Peoples with robust, meaningful engagement drawing on their Traditional Knowledge. A key priority is to strengthen the collaboration between governments and Indigenous Peoples on mitigation and adaptation actions, based on recognition of rights, respect, cooperation, and partnership. Indigenous Peoples will be important partners in developing real and meaningful outcomes that position First Nations, Inuit, and the Métis Nation as drivers of climate action in the implementation of the Pan-Canadian Framework.

While good progress has been made to date, much work remains. This includes continued work to implement carbon pricing systems across Canada in 2018, as well as to develop and finalize a variety of regulations, policies, and programs, including pan-Canadian collaboration on electricity interconnections, building codes, and a zero-emissions vehicle strategy. Other work includes launching new programs to support adaptation, finalizing green infrastructure investments, deepening engagement on clean technology innovation and ensuring effective implementation of clean technology investments and initiatives.

In future years, as funding begins to flow and policies and regulations come into force, the focus of subsequent reports will shift toward concrete results and outcomes to track progress. Over the coming year, federal, provincial, and territorial governments will work collaboratively through the Canadian Council of Ministers of the Environment and through Innovation Ministers to develop and refine ways to measure progress, including through the use of indicators and metrics. Future reports will also identify policy gaps and opportunities, and will provide recommendations on new or expanded areas of work to address them.

1 INTRODUCTION

One year ago, Canada's First Ministers committed to take further action on climate change by adopting the Pan-Canadian Framework on Clean Growth and Climate Change. The Pan-Canadian Framework recognizes the significant costs and risks associated with climate change – risks to the environment, as well as to the health, security, and future prosperity of Canadians. It also positions Canada to take advantage of the significant clean growth opportunities associated with taking action on climate change.

The Pan-Canadian Framework is built on four pillars: pricing carbon pollution, complementary actions to reduce emissions across the economy, adaptation and climate resilience, and clean technology, innovation and jobs.

Over the past year, federal, provincial, and territorial governments have worked together, as well as with Indigenous Peoples, to start implementing the measures in the Pan-Canadian Framework to reduce greenhouse gas (GHG) emissions, build resilience to the changing climate, and enable sustainable economic growth. These actions will help Canada meet or even exceed its 2030 climate change target of a 30% reduction below 2005 GHG emission levels.

In the launch of the Pan-Canadian Framework, First Ministers directed federal, provincial, and territorial governments to report annually to Canadians and First Ministers on progress achieved in order to enable governments to take stock and give direction to sustain and enhance efforts over time.

This first annual synthesis report summarizes progress made over the past year by federal, provincial, and territorial governments in implementing new actions across the four pillars of the Pan-Canadian Framework.

The structure of this report follows that of the Pan-Canadian Framework and provides:

- A high-level overview of progress on each of the four pillars of the Pan-Canadian Framework, including early actions underway and key overall accomplishments to date;
- An overview of the status of reporting and oversight mechanisms and an update on ongoing efforts to improve emissions inventories, projections, and reporting;
- Highlights of expected actions and areas of work for the year ahead; and
- An annex listing all Pan-Canadian Framework actions undertaken in the last year or currently underway by all jurisdictions.

2 PRICING CARBON POLLUTION

Carbon pollution pricing is central to the Pan-Canadian Framework given that it is broadly recognized as one of the most effective, transparent, and efficient policy approaches to reduce GHG emissions. Some provinces have already established carbon pollution pricing systems, while other provinces and territories are moving forward to design or put in place their own systems. The carbon pollution pricing benchmark established by the federal government gives provinces and territories the flexibility to implement either an explicit price-based system (i.e., a carbon tax or a hybrid system with a carbon levy and performance-based system) or a cap-and-trade system.

Significant progress has been made to implement carbon pricing in Canada. Many of these actions build on existing carbon pricing programs already in place in Canadian jurisdictions, which cover about 85% of Canada's economy and population. Economy-wide carbon pricing is in place in several provinces:

- British Columbia has North America's most comprehensive carbon tax currently at \$30/tonne and increasing by \$5 per year starting in 2018, to a maximum of \$50 per tonne, with a targeted performance-based system for industrial emitters;
- Québec had a carbon levy (2007-2015), and has also had a cap-and-trade system since 2013, which guarantees GHG reductions;
- Ontario has a cap-and-trade system (2017); and,
- Alberta extended the reach of its carbon pricing system in 2017, increasing coverage across the economy by introducing a carbon levy, to complement its intensity-based pricing system. A new output-based pricing system will be introduced in 2018.

On September 22, 2017, Ontario, Québec, and California signed an agreement **linking the carbon markets** of the three jurisdictions. This agreement integrates and harmonizes emissions cap programs, allowing entities to meet their emissions compliance obligations in a more flexible and cost-effective manner while maintaining the environmental integrity of each jurisdiction's progress.

This year, progress was made by other provinces and territories² to inform the design and implementation of carbon pricing, including stakeholder engagement to support program development:

- Nova Scotia announced an Agreement-in-Principle with the federal government on clean growth and climate change, and conducted stakeholder consultation on design options for developing a cap-and-trade program. Nova Scotia plans to develop cap-and-trade program regulations in 2018.
- Manitoba announced a Made-in-Manitoba Climate and Green Plan that includes carbon pricing.
- New Brunswick committed to introducing a carbon pricing mechanism during the current session of the legislature.
- Prince Edward Island is preparing to launch a carbon pricing mechanism in 2018.
- Newfoundland and Labrador has passed legislation for a performance-based system for large onshore industrial emitters and has put in place reporting requirements.
- Yukon is studying the impacts of carbon pricing on its residents, businesses and industry.
- The Northwest Territories (NWT) is examining an approach to implementing carbon pricing in the NWT in a manner that reflects the unique circumstances in the NWT.
- Nunavut is studying the impacts of carbon pricing on Nunavummiut.

The federal government released a technical discussion paper outlining the proposed design of the federal carbon pricing backstop system—composed of a levy and performance-based pricing system—for public comment. [The federal government also completed a study with the territories to assess potential impacts of carbon pricing and

² While Saskatchewan and Manitoba have not endorsed the Pan-Canadian Framework, their respective actions and any collaborative efforts to address climate change are included in this report. Saskatchewan did not report on any carbon pricing measures.

inform solutions that address their unique circumstances, including high costs of living and energy, and challenges with food security.] Discussions with Indigenous Peoples are ongoing to find solutions to address their unique circumstances. Federal, provincial, and territorial governments also initiated a review of approaches and best practices to address the competitiveness of emissions-intensive trade-exposed sectors.

3 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to continue taking meaningful action to reduce GHG emissions across all regions and sectors of the economy. The Pan-Canadian Framework approach complements carbon pricing by expanding and linking clean electricity systems across the country, improving the energy efficiency of vehicles, buildings, and industries, putting more zero-emission vehicles on the road, using cleaner fuels to power the economy, and reducing emissions and increasing carbon storage in the agriculture, forestry, and waste sectors. These actions will help cut emissions and will also drive clean growth by spurring development of new clean technologies and creating jobs in many sectors.

In the first year of implementation, significant progress was made to advance measures across all sectors. Funding has been announced and mobilized, and programs have been launched. Regulations are being designed, drafted, and consulted on. New programs are being established. Many of these processes can take years to initiate, but due to focused action and collaboration, work is progressing on accelerated timelines. Collaboration across jurisdictions has been very strong, with governments working together to coordinate actions to ensure long-term success. Responsibility for reporting on progress is shared across a number of federal-provincial-territorial Ministerial tables. Environment Ministers are overseeing progress on a number of key regulatory measures, including for methane, coal, and natural gas. Given that energy production and use accounts for over 80% of Canada's GHG emissions, Energy Ministers have a critical role to play, and are leading on almost half of the collaborative actions in the Pan-Canadian Framework, including on electricity, energy efficiency, and aspects of clean technology and innovation. Many of these actions build on individual and collective work by the federal, provincial and territorial governments through the Canadian Energy Strategy. Transportation Ministers have been overseeing work on important measures to help transition Canada's transportation system towards a low-carbon future, in collaboration with Energy and Innovation Ministers. Forest Ministers and Ministers of Agriculture have been overseeing mitigation actions for the forestry and agriculture sectors.

A number of jurisdictions are making investments to support action in a number of areas such as renewable energy and energy efficiency. The federal government announced billions of dollars in funding to support new investments in electricity infrastructure, transportation systems, energy efficient buildings, and forestry and agricultural projects. Discussions between federal, provincial, and territorial officials on the details of new supporting investments are well underway.

3.1 ELECTRICITY

Non-emitting electricity systems are the foundation of a clean economy. They can support emissions reductions across other sectors like transportation, industry, and buildings. Canada already has one of the cleanest electricity systems in the world and is striving to expand capacity, reduce emissions, and drive clean growth across the economy.

Federal, provincial, and territorial governments committed to work together to move away from traditional coal-fired power generation and toward renewable and non-emitting sources of energy through a combination of regulations on coal and natural gas, and investments in clean energy and supporting infrastructure. Governments also committed to help reduce reliance on diesel in partnership with Indigenous Peoples and northern and remote communities. Good progress was made in 2017 and implementation is on track. All jurisdictions took important steps in 2017 to increase the use of clean electricity, including regulatory amendments, new action plans, policies and programs, and significant new investments and construction of renewable capacity.

To accelerate the phase-out of traditional coal units across Canada by 2030, the federal government published amendments to the coal-fired electricity regulations [in December 2017]. Alberta is also working to phase out its use of coal-fired power and has negotiated agreements with coal generators to phase out coal by 2030. Draft federal regulations for natural gas-fired power *[were also published in December 2017]* with final regulations planned for 2018.

The Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI) has made important strides bringing provincial and federal governments and utilities together to identify the most promising electricity infrastructure projects. Provinces and territories are also advancing renewable electricity regulation, policies and programs to increase energy generation capacity from renewable and non-emitting energy sources. For example, Québec announced an implementation plan for its 2030 Energy Policy with a commitment to increase renewable energy generation capacity by 25 percent. Similarly, Saskatchewan is working towards achieving a target of 50 percent of total generation capacity from renewable energy sources by 2030; the province recently launched a utility-scale solar electricity generation procurement project.

Many jurisdictions committed new funds to help reduce reliance on diesel, working with Indigenous Peoples and northern and remote communities. For example, Yukon is working to implement the Independent Power Production policy by early 2018 to support the participation of independent power products and the development of environmentally sound and affordable electricity. Provinces and territories also worked together through the Pan-Canadian Task Force on Reducing Diesel Use on Off-Grid Communities to develop a common vision for remote energy use.

Announced in August 2017, the governments of Canada and Ontario are collaborating with Wataynikaneyap Power to **connect Pikangikum First Nation to Ontario's power grid**. A 117-kilometre power line from Red Lake to Pikangikum will provide clean, safe and reliable power and eliminate the community's dependence on diesel fuel. Wataynikaneyap Power is a licensed transmission company equally owned by 22 First Nation communities, working in partnership with Fortis Ontario Inc.

Alberta proclaimed the **Renewable Electricity Act** and launched the Renewable Electricity program to support the development of 5,000 megawatts of renewable electricity capacity by 2030. The province also announced \$35 million to fund Indigenous climate leadership initiatives, including renewable and solar energy projects in First Nation and Metis communities.

Newfoundland and Labrador continued work towards the completion of the **Muskrat Falls hydroelectric project**. When completed, 98% of Newfoundland and Labrador's electricity will come from renewable sources, with surpluses exported to Nova Scotia and beyond. The Holyrood Thermal Diesel Generating station, which emits over one million tonnes of GHG emissions per year, will be decommissioned.

3.2 BUILT ENVIRONMENT

Canadians spend much of their lives in buildings that require energy for heating, cooling, lighting, and other services. Designing and retrofitting buildings to use energy more efficiently and using more energy efficient appliances and equipment can cut emissions, improve comfort, increase resilience, and help save money on utility bills.

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to improve efficiency by updating building codes, labelling building energy use, investing in retrofits, and setting new standards for appliances and equipment. Supporting the building industry to increase capacity on energy efficient standards and building practices can help facilitate many of the changes needed in the building sector. Governments also committed to collaborate with Indigenous Peoples as they move to more efficient building standards.

Good progress was made in 2017, and implementation is on track. Federal, provincial, and territorial Ministers of Energy released Canada's Buildings Strategy, which includes an implementation plan for the Pan-Canadian Framework actions on the built environment.

British Columbia has a new **2017 Energy Step Code** that enables communities that opt in to gradually progress to net-zero energy ready buildings, with substantial opportunities to reduce emissions.

In addition, key funding envelopes have been announced and details are being developed, including the \$2 billion Low Carbon Economy Fund. Launched by the Government of Canada on June 15, 2017, the Fund is comprised of two parts: the Leadership Fund and the Challenge Fund. The former will support provincial and territorial actions to reduce GHG emissions and spur clean growth in various sectors of the economy and the latter will support innovative initiatives proposed by a wider range of stakeholders.

The **Green Ontario Fund** was launched in August 2017 to support the deployment of commercially available technology to reduce GHG emissions from buildings or from the production of goods. As part of Ontario's Climate Change Action Plan, it is funded by proceeds from the province's cap on pollution and carbon market. This year, the province is investing \$377 million in the Green Ontario Fund, with further investments planned for the next four years. The agency's first program, GreenON Installations, offers single-family homeowners, at no cost, the installation of a smart thermostat and advice on energy cost savings.

Efficiency requirements for new buildings are also being implemented, and retrofits are being supported through financial assistance programs, new energy benchmarking practices, and infrastructure investments. Manitoba created a new agency to promote energy conservation and efficiency. Newfoundland and Labrador continues to require that new buildings and large renovations receiving any level of provincial funding be built sustainably. Other key actions include new federal standards for heating equipment, a federal-provincial-territorial strategy for making equipment more energy efficient, and new efficiency standards for products. In order to support sustainable housing in Indigenous communities, the Government of Canada is initiating a research project through the National Research Council to define guidelines to support sustainable housing in First Nations communities.

3.3 TRANSPORTATION

The transportation sector is a major source of emissions in Canada. It accounted for nearly 24% of emissions in 2015. There are many opportunities to improve and support transport system efficiency, switch to alternative fuels, and take advantage of new vehicle technologies to achieve emissions reductions from this sector.

Federal, provincial, and territorial governments committed to modernize the transportation system through new emissions standards for vehicles, a plan for establishing retrofit requirements for heavy-duty vehicles, and a strategy to put more zero-emission vehicles on the road. Governments also committed to enhance investments in lower-emitting modes of transportation, including public transit, electric vehicle charging and alternative fuel infrastructure. In collaboration with provinces and territories, industry and other stakeholders, the federal government also set out to develop a clean fuel standard to cut emissions from fuels used in transportation, buildings, and industry.

Alberta is **supporting public transit** through a number of programs and initiatives, including a commitment of \$1.53 billion to the Calgary Green Line LRT and an additional \$176 million for a total of \$600 million to support the Southeast Valley Line LRT in Edmonton.

Implementation is on track to reduce emissions and make the transportation sector more efficient. Federal, provincial, and territorial governments are working together and have engaged with expert working groups to provide advice on the development of a national strategy for zero-emission vehicles (ZEVs). This strategy will complement and build on ongoing actions across jurisdictions, including British Columbia's Clean Energy Vehicle Program, Prince Edward Island's electric vehicle (EV) education campaign, and New Brunswick's installation of 15 new EV charging stations.

Québec is working to **increase the number of zero-emission vehicles** on the road by 2020. Proposed regulations to implement its ZEV standard, coupled with subsidies, underwent consultation in the summer of 2017.

In addition, the federal government published draft regulations to implement emissions standards for heavy-duty vehicles, and many jurisdictions are developing plans to reduce transportation emissions. The federal government has been working with provinces and territories to develop a Clean Fuel Standard framework; a discussion paper

was published this year, consultations were held, including with Indigenous Peoples, and draft regulations are expected in 2018.

3.4 INDUSTRY

Industries are the backbone of the Canadian economy but are also the largest source of emissions. From manufacturing to mining to oil and gas extraction, industries hold great potential to improve efficiency and find new and cleaner ways of operating.

Governments committed to introduce regulations to reduce methane and hydrofluorocarbon (HFC) emissions from industrial operations, help industries improve their energy efficiency, and invest in research and development (R&D) and deployment of new industrial technologies that help reduce emissions.

Implementation is on track. The federal government published draft regulations to reduce methane emissions from the oil and gas sector, and discussed approaches with Alberta, British Columbia and Saskatchewan that will allow for province-specific solutions. Draft federal regulations to phase down the use of HFCs have been published. A number of jurisdictions created or expanded industrial energy efficiency incentives, performance standards, and other supportive measures.

On May 27, 2017, the federal government published draft **regulations to reduce emissions** of methane, a potent GHG, from the oil and gas sector. The regulations aim to reduce unintentional leaks and intentional venting of methane, as well as ensuring that oil and gas operations use low-emission equipment and processes. These actions are expected to reduce GHG emissions by about 20 Mt by 2030.

Federal, provincial, and territorial governments also committed significant funds for research, development, demonstration, and deployment of new cleaner industrial technologies, including for the oil and gas sector.

Emissions Reduction Alberta (ERA)'s \$50 million Oil Sands Innovation Challenge focuses on demonstration projects that involve prototype testing, field piloting, commercial demonstration, or first-of-kind technology deployments of innovative technologies that reduce GHG emissions and improve the cost competitiveness of bitumen production and processing.

3.5 FORESTRY, AGRICULTURE, AND WASTE

Canada's forests, wetlands and agricultural soils represent a major stock of stored carbon, sequestering it from the atmosphere. Managing and expanding this stored carbon is an important part of global climate action.

Governments have committed to protect and enhance carbon sinks, increase the use of wood in construction, support innovative technologies and better practices to reduce emissions from these sectors, and work together to identify opportunities to produce renewable biofuels and bioproducts.

Implementation is on track, with investments made across jurisdictions to enhance carbon storage, protect carbon stocks in forests and agricultural soils and at the same time consider mitigation actions that could help improve sector resilience to climate change. Federal, provincial, and territorial governments are increasingly focused on exploring how forest and agriculture management practices could increase carbon sinks and reduce GHG emissions. To this end, part of the \$2 billion Low Carbon Economy Fund will be used to support eligible projects in the forestry and agriculture sectors.

British Columbia's **Forest Carbon Initiative** is a \$150-million program over five years, starting in 2017, to develop and implement forest activities such as reforestation, increased planting density, and fertilization that reduce emissions and sequester carbon in B.C.'s Crown forests. Outcomes of the initiative, depending on the portfolio mix, are estimated to be: \$26 million annually in GDP impact; 295 jobs per year over five years; and, 50,000 hectares per year treated over five years. Fully implemented, the initiative aims to deliver GHG benefits in the medium-term (2030), longer-term (2050) and beyond.

In July 2017, federal, provincial, and territorial Ministers of Agriculture reached an agreement on the key elements of Canada's new agricultural policy framework, the Canadian Agricultural Partnership, which will include programs to support clean growth and climate change as part of a \$3 billion investment. Under the Partnership, jurisdictions will make investments to enhance carbon storage in agricultural soils, generate bioproducts and biofuels, and advance research and innovation to support GHG emission reductions in the agriculture sector.

Several provincial and territorial governments have implemented actions to produce biomass/bioproducts, improve on-farm energy efficiency, and develop renewable energy through investments in clean technologies. For example, Saskatchewan continues to support improvements in farming practices that help reduce GHG emissions and enhance carbon sequestration, including precision agriculture, zero-till and manure management.

Federal, provincial, and territorial governments are also helping expand the production of bioenergy and bioproducts for multiple uses. One promising application involves helping rural and remote communities reduce reliance on diesel. Governments also continue to promote the use of wood in construction. For example, Alberta, British Columbia, Québec, and New Brunswick recently recommitted to use more low-carbon renewable materials like wood in municipal and government-funded buildings.

In the waste sector, several provincial and territorial governments are undertaking waste diversion projects, as well as projects to use wastes as fuel, for example using wood waste in cement production.

Newfoundland and Labrador continues to work with Regional Service Boards and municipalities across the province to fully implement the **Provincial Solid Waste Management Strategy**. Ongoing infrastructure investments are consolidating and closing out landfills in favour of modern facilities. Composting pilot projects have been developed in several regions of the province to help reduce methane emissions.

3.6 GOVERNMENT LEADERSHIP

Governments can help drive investment and bring new approaches and technologies to market faster by supporting new clean technology through procurement rules and policies.

Federal, provincial, and territorial governments committed to set ambitious targets for emissions reductions from government operations, cut emissions from government buildings and fleets, and scale up clean procurement.

Governments have taken action and are on track to reduce emissions from operations and expand clean procurement practices, including work on greening government operations actions plans, as described in section 5.3. British Columbia is leading the charge with its ongoing commitment to be a carbon neutral government. Alberta has committed to installing 854.7kW of solar energy on government owned buildings. Other jurisdictions are also continuing to explore opportunities to reduce emissions through the use of EVs, energy efficiency, retrofits, procuring renewable energy, and green buildings. The federal government is modernizing its heating and cooling plants, investing in renewable energy, and reducing emissions from its buildings and fleets.

In July 2017, the Government of Canada released its **federal operations GHG emissions inventory**, showing that 15 core departments and agencies have collectively reduced emissions by 19% between 2005-06 and 2014-15. The Government of Canada will continue to report publicly on progress toward reducing GHG emissions from its operations by 40% by 2030, and potentially as early as 2025.

3.7 INTERNATIONAL LEADERSHIP

Canada was instrumental in the negotiation of the historic Paris Agreement, in which countries around the world committed to take action to limit global warming to two degrees above preindustrial levels. Continued leadership and global cooperation are key to moving forward and meeting the Paris Agreement commitment to increase ambition over time.

In the Pan-Canadian Framework, the federal government reaffirmed its commitment to invest \$2.65 billion in international climate finance by 2020, to explore options with provinces and territories for the acquisition of international emissions allowances, and to collaborate with provinces and territories as well as international partners to ensure that trade rules support climate policy. The federal government also reiterated its commitment to continue to engage with and support Indigenous Peoples' action on international climate change issues. This includes work through the United Nations Framework Convention on Climate Change (UNFCCC) to formulate a platform for Indigenous Peoples, as agreed to in the Paris decision.

Implementation is on track. Of the \$2.65 billion that Canada has pledged to help developing countries transition to low-carbon, climate resilient economies, the federal government has announced more than \$900 million in funding contributions. In addition, Québec announced \$25.5 million mainly for Francophone countries that are most exposed to the impacts of climate change. Further to contributions to multilateral development banks, Canada is also providing direct support to developing countries to reduce emissions and adapt to the effects of climate change. This includes, for example, \$13 million to support climate smart agriculture development in Central America; \$39 million to help build the resilience of farming households in Senegal, with a particular emphasis on women and young people; and \$15 million to promote climate technology innovation in Vietnam.

The federal government, in consultation with provinces and territories, has been working with international partners to assess how best to design and use market and non-market mechanisms under the Paris Agreement. Québec, British Columbia, Ontario, and the State of California have demonstrated leadership through their partnership in the Western Climate Initiative, as has British Columbia through its partnership with California, Washington, Oregon and Alaska (as an observer) in the Pacific Coast Collaborative. Discussions on trade and climate policy have been initiated through the World Trade Organization and other international forums. The federal government has also begun working with Indigenous Peoples to establish a Local Communities and Indigenous Peoples' Platform under the UNFCCC, including by convening informal discussions and through formal negotiations at COP23 in Bonn, Germany.

4 ADAPTATION AND CLIMATE RESILIENCE

In the Pan-Canadian Framework, federal, provincial, and territorial governments underscored the significant risks that climate change impacts pose to communities, the health and well-being of Canadians, the economy, and the natural environment. Canada's northern and coastal regions and Indigenous Peoples are especially vulnerable. The PCF represents the first time that federal, provincial, and territorial governments have identified priority areas for collaboration to build resilience to a changing climate across the country:

- Ensuring Canadians have information and multidisciplinary expertise to consider climate change in their planning and decision-making;
- Building climate resilience through infrastructures
- Working to protect the health and well-being of Canadians;
- Supporting particularly vulnerable regions and Indigenous Peoples in addressing climate impacts; and
- Reducing the risks to communities from climate-related hazards and disasters.

For each priority area, federal, provincial, and territorial governments identified new actions that would advance efforts towards a more resilient Canada. These actions range from measures to improve access to climate science and information that supports adaptation decision-making, to investments in built and natural infrastructure to increase climate resilience in communities, to efforts that help us better understand and take action to address climate-related health risks such as extreme heat and infectious diseases.

This first year of implementation provided a solid foundation for this work, including the announcement of significant new investments in adaptation and climate resilience. New programs to support adaptation efforts are being established, codes and standards for climate resilience are under development, and initiatives to build regional capacity for adaptation action across all the priority areas have been launched.

Efforts are underway across many portfolios to advance adaptation and resilience (e.g., health, relations with Indigenous Peoples, emergency management, infrastructure, local government, natural resources, fisheries, agriculture, energy, economy and innovation). Ministers of Agriculture are advancing efforts to adapt to the impacts of climate change through the Canadian Agricultural Partnership that will build capacity in the agricultural sector while also supporting science, research and innovation. In addition, Forest Ministers are undertaking work to better combat the spread of pests that destroy forests, such as the mountain pine beetle and spruce budworm.

4.1 TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION

Understanding how the climate and the environment are changing and how future conditions will impact Canada is essential for taking action to adapt and build resilience across the country. Climate science and information and Indigenous Knowledge can inform important decisions that will help manage risks, reduce costs, and ensure society thrives in the face of a changing climate.

As the foundation for advancing adaptation in Canada federal, provincial, and territorial governments committed to improve access to authoritative, foundational climate science and information to support adaptation decision-making across the country, build regional capacity and expertise, respectfully incorporate Traditional Knowledge, and mobilize action.

To support hazard mapping activities and risk assessments in the Atlantic region, New Brunswick has made **climate change data** as well as other data to inform flood risk mapping (e.g., LiDAR) publicly accessible. Nova Scotia has produced and made publicly available regional climate data and local flood risk maps to be used by planners, researchers and the public across the province. Prince Edward Island has secured federal funding approval under the National Disaster Mitigation Program to conduct a risk assessment of coastal infrastructure assets, to develop coastal hazard maps for the entire coastline, and to make the data publicly accessible.

Implementation is on track with all governments working in partnership to improve climate services in Canada, including the design phase of a Canadian Centre for Climate Services. The federal government is also working with governments and organizations to build adaptation expertise and develop regionally-specific risk assessments and adaptation information.

The **Canadian Centre for Climate Services** will deliver trusted climate information, data, and tools that will support adaptation decision-making. Training, support, and user-driven products will ensure tools are used while partnerships with other organizations will shape and deliver services across the country.

Provinces and territories have undertaken initiatives to build regional capacity for decision-making and addressing climate impacts, including providing funding for regional organizations. For example, Ontario is planning to launch a new climate change organization to ensure decision-makers have access to cutting edge, region-specific climate impact information, as well as the services required to ensure users with different levels of capacity can make use of it. Saskatchewan is funding research projects to help mitigate and enhance resilience to climate change, including research on drought resistant crops, prediction and management of pests and diseases, carbon sequestration through agronomic practices, and minimizing the vulnerability of forests to climate change.

Manitoba is providing funding support of \$400,000 for the creation of the **Prairie Climate Centre** to develop climate data to inform decision-making and address climate impacts.

The Maliseet Nation Conservation Council, with support from the federal government, is working with three Maliseet communities in New Brunswick to build resilience to climate change. The project combines **community knowledge** from traditional ecological surveys and interviews with Elders, while data from a vulnerability assessment on final strategic planning document will help the communities better prepare for climatic changes.

4.2 BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE

Designing and investing in built and natural infrastructure that can withstand and help us manage changing climate conditions is essential to the health, safety, and sustainability of our communities and economy.

Federal, provincial, and territorial governments committed to partner to invest in infrastructure projects that build climate resilience and to work together to integrate climate resilience in building design codes and guides.

Implementation is on track for 2017, with significant investments to support climate resilience through infrastructure by all levels of government. For example, a portion of the cost-shared \$9.2 billion announced by the federal government for Integrated Bilateral Agreements with provinces and territories will be invested in adaptation and climate resilience, and on a cost share basis an additional \$2 billion has been committed to a Disaster Mitigation and Adaptation Fund for large-scale infrastructure projects. This fund represents Canada's largest dedicated source of funding for built and natural, large-scale infrastructure projects designed to protect communities from natural disasters and extreme weather and build climate resilience. Manitoba is also making strategic infrastructure investments of no less than \$1 billion annually to support economic growth and improve flood protection.

Governments are also working together to build the tools to help ensure significant investments are resilient to climate change. For example, a federal-provincial-territorial Working Group is helping develop a Climate Lens to ensure climate resilience is considered for Investing in Canada Infrastructure Program and Disaster Mitigation and Adaptation Fund projects.

Research is underway to update building codes and guidance and standards are being developed to support decision-making for climate resilient infrastructure. Some provincial and territorial governments are requiring consideration of climate change impacts in infrastructure design, and undertaking initiatives to increase resilience to flooding.

Since 2008, Québec has been assessing natural risks and developing and **implementing climate change adaptation strategies** for Nunavik transportation infrastructure built on permafrost. The ongoing research projects assess the effectiveness of full-scale adaptation solutions.

More than 90% of Newfoundland and Labrador's population is situated along the coastline which is affected by storm surges and erosion. The province is enhancing its **network of coastal monitoring stations**. There are currently 116 stations in the province, including five in northern Labrador Indigenous communities. Data from these stations informs infrastructure, planning, and development decisions.

4.3 PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING

Focused efforts to address rising climate-related health risks help Canadians take action to protect themselves and prepare the health care system to deal with emerging challenges. Community-based approaches and solutions are key to the vitality and well-being of Indigenous Peoples facing unique and growing challenges related to health.

Federal, provincial, and territorial governments committed to collaborate to address climate change-related health risks, including extreme heat, and climate-driven infectious diseases, such as Lyme disease. The federal government committed to support First Nations and Inuit communities to undertake health adaptation projects and work with the Métis Nation on addressing the health effects of climate change.

The Government of the Northwest Territories has developed **public health advice to minimize health impacts** due to wildland fire smoke and a visibility index tool to estimate current air quality and identify appropriate actions. NWT has also been working to deploy portable air monitoring equipment during smoke events, and update the health and social service system's emergency response capacity and preparedness.

Good progress has been made in 2017 with federal, provincial, and territorial governments advancing efforts to reduce the harmful consequences of climate change on the health and well-being of Canadians. For example, provinces and territories have developed new heat warning thresholds, expanded Heat Alert and Response Systems for smaller communities, and advanced monitoring and awareness building of climate change impacts on health. The federal government has launched a framework and action plan on Lyme Disease that will focus on surveillance, education and awareness, as well as guidelines and best practices related to prevention, diagnosis and treatment. It is also increasing support for First Nations and Inuit communities to undertake climate change and health-adaptation projects and working with the Métis Nation to address the health effects of climate change.

As part of new federal funding for climate change health initiatives, the first call for proposals under the new **Infectious Diseases and Climate Change Fund** was issued to address the impact of climate change on human health by building and increasing access to infectious disease-based evidence, education, and awareness.

A new website, www.climate-telling.info, has also been created to support Indigenous Peoples in sharing knowledge and information on climate change adaptation.

4.4 SUPPORTING PARTICULARLY VULNERABLE REGIONS

While all regions in Canada are faced with unique challenges from the impacts of climate change, the Indigenous Peoples of Canada, along with coastal and northern regions, are particularly vulnerable and disproportionately affected. Understanding climate change impacts and taking action to adapt will help the most vulnerable communities, traditional ways of life, and economic sectors thrive in a changing climate.

Federal, provincial, and territorial governments committed to invest in infrastructure to protect vulnerable regions and communities, build climate resilience in the North, support community-based monitoring by Indigenous Peoples, and support adaptation in coastal regions.

Implementation is on track for 2017. Infrastructure investments under the Investing in Canada Plan will help build resilience in vulnerable coastal and northern regions, and new and enhanced programming has been launched to support northern communities and Indigenous Peoples in monitoring climate changes, assessing impacts, and identifying adaptation solutions. Progress has been made on the development of the multi-partner Northern Adaptation Strategy that will build capacity in the North.

The governments of Canada, Yukon, the Northwest Territories, Nunavut, Québec and Newfoundland and Labrador as well as northern Indigenous organizations are collaborating to develop the **Northern Adaptation Strategy**. The Strategy, to be finalized in 2018, will set the stage for a new collaborative approach to addressing adaptation throughout the North, including identifying priorities for mobilizing action, fostering innovation to support the development of strong and resilient communities and contributing to renewed Arctic leadership.

Federal programming has been renewed to support adaptation efforts in coastal regions with credible scientific information and predictions of climate change impacts on fisheries, ecosystems and coastal infrastructure. Targeted regional efforts have been undertaken to increase resilience to flooding.

As a coastal province, Nova Scotia has focused on increasing its resilience to flooding. The province is developing new dyke standards, restoring salt marshes, and providing funds to municipalities through the **Flood Risk Infrastructure Investment Program**.

In partnership with Yukon First Nations and municipalities, Yukon is planning a new integrated strategy for energy, climate change and green economy to help enhance resilience to climate change across the territory. Yukon is also supporting monitoring and data collection at Herschel Island-Qikiqtaruk Territorial Park to document climate change impacts on the ecosystems and wildlife of this remote arctic island. The Northwest Territories has developed a Climate Change Strategic Framework and supporting adaptation by Indigenous Peoples is a key

priority for the Government of the Northwest Territories. The government is partnering with the NWT Association of Communities to facilitate adaptation efforts across the territory.

Québec, in collaboration with Kativik Regional Government and Consortium Ouranos, is developing a synthesis of **knowledge on Nunavik's projections** on sea and coastal ice, weather extreme events, storm surges and coastal risks in the context of climate change.

4.5 REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS

With climate change expected to exacerbate hazards such as floods, wildfires, drought, extreme heat, high winds, and road failures, effective disaster risk-reduction efforts and adaptation measures are key to reducing the severe negative impacts these events can have on communities and the economy.

The 2017 wildfire season in British Columbia saw an unprecedented 1,215,745 hectares burned, almost eight times the 10-year average area burned for 2006-2016. More than 65,000 people were displaced and firefighting costs exceeded \$550 million. The province has commissioned an independent review of recent events and will continue to fund community-level wildfire risk reduction and landscape-level fire management activities.

Federal, provincial, and territorial governments committed to invest in traditional and natural infrastructure that reduces climate-related disaster risks, advance efforts to protect against floods, and support adaptation in Indigenous communities facing repeated and severe climate impacts.

Implementation is on track for 2017, with billions of dollars under the Investing in Canada Plan, including the new Disaster Mitigation and Adaptation Fund, for investments in traditional and natural infrastructure to reduce climate-related hazards and disaster risks. Federal, provincial, and territorial governments have worked together on developing a Federal Floodplain Mapping Guidelines Series to help advance floodplain mapping activities across jurisdictions in Canada. A wide range of actions are also underway across many jurisdictions to address flood risks.

To enhance efforts to protect against floods, the Québec government held a **forum on flood management solutions** in October 2017. The province also started a project to help 88 coastal municipalities identify and reduce their vulnerabilities to coastal erosion and increase their resilience to climate change.

Additional targeted initiatives include federal enhancements to the First Nations Adapt program for flood mapping activities and provincial and territorial support for municipalities and communities in building long-term resilience to flooding as well as drought events, preventing coastal erosion and landslides through adaptation planning, and sharing of best practices.

In 2017, the **Alberta Community Resilience Program** awarded \$58.5 million to 25 projects in 20 municipalities and First Nation communities for the development of long-term resilience to flood and drought events. Additionally, \$4.86 million was awarded through the Watershed Resiliency and Restoration Program for 32 projects to restore and improve natural watershed functions to enhance natural resiliency to droughts and flood.

5 CLEAN TECHNOLOGY, INNOVATION AND JOBS

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to a common vision of immediate actions designed to accelerate clean growth in Canada and abroad. Collaboration led to advancements in each of the four core elements of the Pan-Canadian Framework's clean technology, innovation and jobs pillar including: building early-stage innovation, accelerating commercialization and growth, fostering adoption, and strengthening collaboration and metrics for success. These actions will help create the conditions necessary to position Canada as a leader in the global clean economy.

To achieve this, governments are working together on a number of actions including access to capital that will help Canada's clean technology firms grow and expand through financing, and a streamlined "no-wrong door" approach to delivering client services for clean technology producers. Additional initiatives include new procurement programs aiming to promote clean technology adoption, and improved data on Canadian clean technologies. The development of "grand challenges"-type programming is another area of collaboration that focuses on accelerating efforts to solve Canada's big climate change challenges.

Innovation Ministers, along with Ministers in other areas such as Energy and Agriculture, are overseeing progress on key clean technology and innovation measures under the Pan-Canadian Framework. Innovation Ministers have also charged their officials to develop and implement a work plan to increase collaboration on clean growth. This includes sharing information and collaborating on existing and future federal, provincial and territorial initiatives for clean growth.³ In the first year of implementation, good progress was made across all clean technology and innovation measures in the Framework. Funding has been committed, partnerships are being developed, and programs are being launched.

5.1 BUILDING EARLY-STAGE INNOVATION

Canada needs a strong flow of innovative ideas to become a leader in the development and deployment of clean technologies. Government investments in clean technology research, development, and demonstration (RD&D) will most effectively help Canada meet its climate change goals, create economic opportunities, and expand global-market opportunities, while positioning the country's energy, mining, forest and agriculture sectors as leaders in the new resource economy.

Federal, provincial, and territorial governments committed to support new approaches to early-stage technology development, including breakthrough technologies, to advance research in areas that have the potential to substantially reduce GHG emissions and other pollutants. A key element of this work is supporting the development of innovative ideas to solve the big challenges Canadian communities currently face, such as reducing Canada's rural and remote communities reliance on diesel as a power source.

Strong progress was made in 2017 and key initiatives are on track. Governments are implementing individual measures and at the same time working together through the Federal-Provincial-Territorial Working Group on Clean Growth to collectively identify specific technology "missions" or "challenge" areas that could inform new initiatives to help solve Canada's big challenges and accelerate clean energy innovation.

The Government of Ontario created a "Grand Challenge" initiative, the **Ontario Solutions 2030 Challenge**, a global call for innovators to propose their solutions to help Ontario industry reduce GHG emissions. The Challenge will support a winning team to bring their transformative technology to market. Phase one of the challenge is currently underway.

In addition, the Government of Canada allocated \$200 million in Budget 2017 to support clean technology research, development, and demonstration in Canada's natural resources sectors. As part of this, the \$155 million Clean Growth in Natural Resource Sectors Program focusing on the energy, mining, and forestry sectors was launched in October 2017. Project co-funding with provinces and territories is a requirement under this program. Projects are anticipated to be announced in 2018.

5.2 ACCELERATING COMMERCIALIZATION AND GROWTH

Canada's success in the clean technology marketplace requires globally competitive talent, access to the capital and resources needed to demonstrate the commercial viability of products, and strong international networks that facilitate the cross-border flow of clean technology goods and services. Streamlining and integrating access to support programs and services is also a priority, and essential to building commercial capacity.

³ The Federal-Provincial-Territorial Working Group on Clean Technology, Innovation and Jobs was one of four Federal-Provincial-Territorial Working Groups mandated by First Ministers to present options to act on climate change and enable clean growth.

Federal, provincial, and territorial governments committed to work together to improve access to government programs, increase support to advance and commercialize innovative technologies, and strengthen support for skills development and business leadership. Governments also committed to collaborate on expediting immigration processes for global talent and highly qualified personnel, promoting exports of clean technology goods and services, and playing a leadership role in international standards-setting processes for new clean technologies.

Implementation of these and other initiatives is well on track for 2017. Governments are working together to create a coordinated “no-wrong door” approach to supporting Canadian clean technology businesses and ensuring full and effective access to relevant government programs and services. For example, Québec and the federal government partnered to offer services through specific portals namely, the Entreprises Québec and Infos Entrepreneurs, to address the needs of entrepreneurs.

Federal, provincial, and territorial governments are also working together to enable access to capital for clean technology businesses to help bring their products and services to market. In its 2017 budget, the Government of Canada allocated \$1.4 billion to the Business Development Bank of Canada and Export Development Canada to support the growth of Canada’s clean technology firms through project financing. An additional \$400 million committed through the Sustainable Development Technology Canada (SDTC) will support clean technology producers in building commercial and export capacity and position Canada as a global leader in the commercialization of clean technology. A framework to guide Canadian clean technology firms’ access to capital is being finalized and new projects continue to be evaluated. Companies have also begun to access the new SDTC funding.

Several provinces and territories are also partnering with new federal funding to leverage and maximize outcomes for clean technology producers. For example, the Government of British Columbia and the Government of Canada have established a \$40 million partnership between the Innovative Clean Energy Fund and SDTC to support the development of pre-commercial clean energy projects and technologies. The funding available through this joint fund will leverage federal, provincial, territorial and private sector investments.

Nova Scotia and the Atlantic Canada Opportunities Agency (ACOA) provided funding to support start-ups through six **business acceleration programs** that will be delivered this fall, including a new competition to find innovative ways to address problems in the ocean sectors.

A number of provincial governments are also developing strategies to address skills shortages in specific industries. In addition, the federal government has launched a new Global Skills Strategy to support employers in attracting top talent and new skills to Canada. To support clean technology exports and access to global markets, the federal government is implementing an international business development strategy for clean technology. New funding has been allocated to the Standards Council of Canada to support efforts related to international standards-setting.

Saskatchewan is demonstrating global leadership through the transfer of Carbon Capture and Storage (CCS) knowledge and through collaboration with the International Standards Organization in the **development of international standards for CCS** to accurately measure, monitor and verify emission reductions by CCS projects.

5.3 FOSTERING ADOPTION

Support for domestic adoption of Canadian clean technologies is needed for Canada to achieve its climate change goals, build climate-resilient infrastructure, and create a strong domestic clean technology market. This will also help lay a solid foundation of support for Canadian clean technology firms heading to global markets.

Federal, provincial, and territorial governments committed to foster the adoption of clean technology through leading by example as early adopters of clean technology and serving an essential role as a first or “reference customer” for Canadian clean technology goods, services and processes.

Innovative Solutions Canada, a \$50 million new innovation procurement program, was launched in the fall to enhance early stage clean technology R&D, including clean technology innovation through the development and validation of novel products and services from Canadian innovators and entrepreneurs.

Governments also committed to working together to support Indigenous Peoples and northern and remote communities in adopting and adapting clean technologies and ensuring business models support community ownership and operation of clean technology solutions to reduce reliance on diesel.

Implementation of initiatives is on track for 2017. Work is underway by federal, provincial, and territorial governments to develop action plans for greening government operations and encourage utilities and municipalities and other public sector entities to adopt clean technologies to lead by example. The Government of Canada's Greening Government Operations Centre is taking steps to support technology adoption that makes government procurement an essential first deployment/ reference market for new technology. Federal and provincial governments also supported visible and effective certification programs (e.g. ENERGY STAR) and other programs to ensure consumer and business confidence, support green procurement, and the adoption of clean technology.

5.4 STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS

An effective strategy to clean technology development, commercialization, and adoption in Canada requires coherent, collaborative, and focused approaches.

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to work together to enhance policy and program alignment across jurisdictions and institutions and to establish a clean technology data strategy.

In 2017, good progress was made and implementation is on track. The Government of Canada announced the creation of the Clean Growth Hub to streamline client services, improve federal program coordination, enable tracking and reporting on clean technology results across government, and connect stakeholders to international markets. The Clean Growth Hub is focussing efforts on program coordination, engaging federal partners and consulting stakeholders, including provinces and territories.

Federal, provincial and territorial also undertook concrete action to build better clean technology data capacity and potential, as well as clear metrics for tracing the impact of government activities. The Government of Canada committed \$14.5 million to develop a clean technology data strategy to ensure the alignment and integration of data collection and reporting activities to foster consistent, complementary and comparable information on the Canadian clean technology economy. The federal-provincial-territorial working group undertook consultations with provinces, territories, industry and other stakeholders to advance the development of the clean technology data strategy. The first release of national data by Statistics Canada, in fall 2017 [tbc], provided for the first time a comprehensive snapshot of the clean technology economy.

Under the Ontario-Québec Joint Work Plan on Economic Development Through Climate Change Innovation, the two provinces joined forces with Statistics Canada and the sub-committee on the federal clean energy technology strategy, namely to identify issues related to defining the clean technologies sector for the compilation of statistics.

6 REPORTING AND OVERSIGHT

MEASUREMENT AND REPORTING ON EMISSIONS

Under the Pan-Canadian Framework, federal, provincial and territorial governments committed to collaborate through the Canadian Council of Ministers of the Environment (CCME) to track and report GHG emissions in a consistent way across the country, to monitor progress of the Pan-Canadian Framework, and to support

international reporting obligations. In 2017, good progress was made in all of these areas. To increase consistency across emissions inventories and GHG emissions reporting, CCME explored opportunities for greater alignment on GHG emissions reporting standards and requirements across various sectors of the economy. While governments are already aligned in some areas, they will continue to explore options for achieving greater consistency of emissions inventories and tracking. CCME also undertook to improve projections of future GHG emissions. In particular, CCME is developing best practices and guidelines on modelling technological change. This guidance will help increase alignment and improve consistency across jurisdictions in this area. Federal, provincial, and territorial governments have also committed to examining options for a pan-Canadian GHG offsets framework to develop best-practices in offset system design to support creation of verified carbon credits that can be traded domestically and internationally. To this end, CCME completed extensive stakeholder engagement and identified areas to support the development of this framework.

REPORTING ON IMPLEMENTATION

The implementation of the Pan-Canadian Framework is a collaborative effort and a shared responsibility of federal, provincial and territorial governments. A governance structure has been established to support intergovernmental coordination on Pan-Canadian Framework implementation and reporting. Nine federal-provincial-territorial Ministerial Tables are responsible for coordinating Pan-Canadian Framework actions that fall within their respective Ministerial portfolios, including Environment, Energy, Infrastructure, Transport, Forestry, Agriculture, Innovation, Emergency Management and Finance. Four Ministerial Tables (CCME, Energy, Innovation, and Finance) are mandated to provide strategic analysis and oversight for each of the Pan-Canadian Framework pillars. A new Federal-Provincial-Territorial Coordinating Committee of Experts has been established to develop the annual Synthesis Report to First Ministers that integrates Pan-Canadian Framework-related input from federal-provincial-territorial Ministerial Tables. The Intergovernmental Affairs Deputy Ministers plays a key role in finalizing and delivering this annual report to the First Ministers.

This first annual Synthesis Report to First Ministers focuses on tracking progress in establishing governance structures, mobilizing funding and initiating programs and regulations. The focus of subsequent reports will shift toward concrete results and outcomes to track collective national results and progress in implementing the Pan-Canadian Framework. In order to facilitate robust and coordinated reporting going forward, over the coming year federal, provincial, and territorial governments will work collaboratively through the Canadian Council of Ministers of the Environment to identify appropriate ways to track progress on the Pan-Canadian Framework. These efforts may be informed by other initiatives underway, including the Expert Panel on Climate Change Adaptation and Resilience Results, which will provide advice to the federal government on measuring progress on adaptation and climate resilience in March 2018, as well as the work of a federal-provincial-territorial working group currently undertaking consultation to advance the development of the clean technology data strategy. Future reports will also identify policy gaps, implementation challenges and opportunities and provide recommendations on how to address them.

ANALYSIS AND ADVICE

Governments have committed to engaging experts to ensure that actions taken are effective and that decision-making is informed by science and evidence. In the coming months, the Government of Canada will engage provinces and territories on options for expert engagement, as committed to under the Pan-Canadian Framework, to support analysis and the provision of advice to promote clean growth and address climate change in Canada.

REVIEW

Federal, provincial and territorial governments will work together to establish the approach to the review of carbon pricing, including expert assessment of stringency and effectiveness that compares carbon pricing systems across Canada, which will be completed by early 2022 to provide certainty on the path forward. As an early deliverable to the interim review in 2020, work was initiated to examine approaches and best practices to address the competitiveness of emissions-intensive and trade-exposed sectors.

COMMITMENT TO CONTINUE TO ENGAGE AND PARTNER WITH INDIGENOUS PEOPLES

First Ministers directed federal, provincial, and territorial governments to work together to report on the implementation of the Pan-Canadian Framework, engaging with relevant ministerial tables, and with meaningful involvement of Indigenous Peoples. Federal, provincial, and territorial governments will continue to engage and partner with Indigenous Peoples as actions are implemented and progress is tracked. The Government of Canada is collaborating with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation and partnership. These tables will provide a structured, collaborative approach for ongoing engagement with Indigenous Peoples in the implementation of the Pan-Canadian Framework and on broader clean growth and climate change priorities. This will help ensure that Indigenous Peoples are full and effective partners in advancing clean growth and addressing climate change.

7 LOOKING AHEAD

One of the objectives of reporting annually on Pan-Canadian Framework implementation is to facilitate an assessment of policy gaps and recommend further action in order to increase ambition over time. At this early stage of implementation, many programs, investments and regulations are still in the process of being designed and developed. Since assessing gaps first requires an evaluation of results and outcomes, this will be a feature of future reports, once data can be reported against indicators and attributed to Pan-Canadian Framework actions. In some cases, this may take time. For example, assessing the impact of policies on reducing GHG emissions will occur further in the future due to the lag between policy action and behaviour change, as well as the lag between actual emissions and the publication of emissions numbers.

PRICING CARBON POLLUTION

While most provinces and territories that do not currently have carbon pricing system in place have demonstrated a commitment to implement carbon pricing, some have not yet identified which carbon pricing system will be applied in their jurisdiction. This will be important to ensure that jurisdictions are in a position to have pricing systems take effect in 2018. Communicating program design details in a timely manner is also key to providing consumers and investors with the clarity needed to inform choices and support Pan-Canadian Framework goals of reducing GHG emissions while growing our economy.

Moving forward, work will continue towards implementing carbon pricing systems across Canada in 2018. As affirmed in the Vancouver Declaration and reiterated in the Pan-Canadian Framework, provinces and territories continue to have the flexibility to design their own policies to meet emissions-reduction targets, including carbon pricing, adapted to each province and territory's specific circumstances.

The federal government will also engage with provincial and territorial governments and stakeholders to ensure that emissions from commercial inter-provincial/territorial aviation could be properly covered.

Overall, as jurisdictions move forward with implementing carbon pricing systems, it will be beneficial to share lessons learned.

COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

It will be important to continue cross-jurisdiction collaboration as measures are developed and implemented. For example, on zero-emission vehicles, federal, provincial, and territorial governments are working together to develop a national strategy. Developing policies together helps ensure new and existing policies are complementary. Federal, provincial, and territorial governments will work to identify additional opportunities for linking and aligning new and existing work across jurisdictions.

Key regulatory milestones over the coming year include publishing final regulations to phase out emissions from coal-fired electricity, for natural gas-fired electricity, to cut methane emissions from the oil and gas sector, and for heavy-duty vehicles, as well as draft regulations for the clean fuel standard. A range of other initiatives will be advanced over the coming year, including energy efficiency standards and related work for buildings, industrial energy efficiency programming, developing an approach to improve efficiency in the off-road sector, establishing technology funding programs, and finalizing investments in renewable energy, electricity transmission and smart grid projects. Work will also continue with negotiations under the Paris Agreement, including developing robust guidance under Article 6 for the use of international carbon markets

Federal, provincial, and territorial governments will continue to work together and discuss key Pan-Canadian Framework initiatives that require ongoing pan-Canadian collaboration, including on electricity interconnections, building codes, the ZEV strategy, and a range of investments. Federal, provincial, and territorial governments will also finalize the terms of \$9.2 billion for green infrastructure (including support for electricity infrastructure, renewable energy, and other projects) and the Leadership Fund portion of the \$2 billion Low Carbon Economy Fund.

The Government of Canada is working in partnership with the Assembly of First Nations (AFN), Inuit Tapiriit Kanatami (ITK), and the Métis National Council (MNC), to establish the three distinctions-based senior bilateral tables for ongoing engagement with First Nations, Inuit, and the Métis Nation in the implementation of the Pan-Canadian Framework and on broader clean growth and climate change priorities. In October, 2017, Canada and the AFN held the first bilateral meeting of their Joint Committee on Climate Action; Canada continues to work in partnership with ITK and MNC to establish their respective bilateral tables and plans to hold inaugural meetings with Inuit and the Métis Nation by the end of 2017.

ADAPTATION AND RESILIENCE

Over the coming year, efforts will continue to focus on launching new programs and operationalizing planned initiatives. Key milestones include the launch of the Canadian Centre for Climate Services and the Disaster Mitigation and Adaptation Fund, including identifying projects for the first round of funding, approval of integrated bilateral agreements with provinces and territories for infrastructure investments, and finalizing the Northern Adaptation Strategy. Efforts will continue to better understand and track the impacts of climate change on health and well-being and to develop innovative solutions to reduce these climate-related health impacts, as well as to support capacity building for Indigenous Peoples to address a wide range of climate change adaptation challenges.

It will be important to ensure that the Pan-Canadian Framework continues to draw on work from other existing federal-provincial-territorial working groups to link adaptation work that is ongoing and planned across each of the Ministerial tables.

Potential future collaborative work to advance adaptation and resilience across Canada could include:

- Identifying potential for integration of adaptation and GHG mitigation objectives;
- Looking at ways to increase the climate resilience of government institutions (e.g., sharing best practices, lessons learned, international examples);
- Developing guidance or sharing best practices and, information approaches for investments in resilient infrastructure, including natural infrastructure; and
- Working on climate change adaptation in coastal regions (e.g., developing a coastal adaptation strategy; sharing tools, information, approaches, best practices; compendium of tools).

Ministers of the Environment will continue to champion adaptation efforts within federal, provincial, and territorial governments, and engage all Ministers (e.g., health, relations with Indigenous Peoples, emergency management, infrastructure, local government, natural resources, forests, agriculture, fisheries, energy, economy and innovation) to take action to adapt and build resilience, as adaptation involves the mandates of these Ministerial

tables. This includes encouraging all levels of government, businesses, communities and citizens to take action to identify climate change as a priority for urgent and sustained action to ensure that climate risks are being considered, and addressing those risks across sectors, jurisdictions and communities across Canada. By continuing to support and mobilize action broadly across all sectors and regions, federal, provincial, and territorial governments will work to increase Canadians' resiliency to the impacts of climate change now and in the future.

CLEAN TECHNOLOGY, INNOVATION AND JOBS

The Federal-Provincial-Territorial Working Group on Clean Growth has identified the following future opportunities to deepen engagement on clean technology innovation:

- Ensuring access to financing for smaller companies to mature and access larger scale funding later on will maximize and complement the suite of clean technology funding already available.
- Further deepen and strengthen governments' alignment efforts to fully realise the opportunities created through support for Canada's clean technology sector.
- Continue work to better understand and overcome the barriers faced by Indigenous Peoples in accessing the full suite of federal funding.
- Additional collaboration to support the development of the skills necessary to successfully integrate a low-carbon economy. This includes general innovation and entrepreneurial skills, such as increasing the awareness and knowledge by youth of the business skills required to lead a tech start-up.
- Continue work to help Indigenous Peoples overcome barriers in accessing the full suite of federal funding.
- Explore creation of a regulatory sandbox – a safe space for businesses to test innovative products in a live environment without being fully subject to regulations.

Innovation Ministers will continue collaborative efforts to ensure an effective implementation of clean technology investments and initiatives that aligns with program and policies to maximize clean technology outcomes. As implementation advances, there will be additional opportunities for the Federal-Provincial-Territorial Working Group on Clean Growth to utilize its influence and expertise in playing a pivotal role to advance Canada's clean-technology landscape.

Over the coming year, work will continue across a number of areas, including implementing federal funding support for clean technology research, and the development, demonstration and adoption of clean technology in Canada's natural resources sectors through the selection of projects. Innovation initiatives will continue to be developed and rolled out and Sustainable Development Technology Canada will continue to select and announce projects. Provinces and territories will formalize partnerships with the federal government regarding the access to capital support as well as the Sustainable Development Technology Canada funding. The first round of challenges is planned for the new federal innovation procurement program. As well, the Federal-Provincial-Territorial Working Group on Clean Growth will continue to develop a procurement resource toolkit for municipalities, universities, school and hospitals to help them leverage existing green procurement initiatives or adopt similar practices. Work will also continue to support certification programs such as the ENERGY STAR program. To implement the Clean Growth Hub, a central office will be established to improve client service. As well, to support the clean technology data strategy work will include continuing consultations, deepening metrics and annual data reporting.

ANNEX I: STATUS OF ALL PAN-CANADIAN FRAMEWORK ACTIONS

PRICING CARBON POLLUTION

Canada

In 2017, Canada began the implementation of the pan-Canadian approach to pricing carbon pollution through the:

	<ul style="list-style-type: none"> • Release of the Government of Canada's Technical Paper on the Proposed Federal Carbon Pricing Backstop (May 18, 2017) for public comment; • Publication of additional guidance on the pan-Canadian carbon pollution pricing benchmark (as follow up to the announcement on October 3, 2016); • Provision of ongoing technical support to provinces and territories currently without carbon pricing systems such as modelling expertise, as requested; • Completion of a study with the territories to find solutions that address their unique circumstances, including high living expenses and of high cost of energy, challenges with food security, and their emerging economies; • Ongoing discussions with Indigenous Peoples to find solutions that address their unique circumstances; and • Initiation of a review to assess approaches and best practices to address the competitiveness of emissions-intensive trade-exposed sectors.
<i>British Columbia</i>	British Columbia's carbon tax, in place since 2008 and currently set at \$30/tonne CO ₂ e, will increase by \$5/tonne per year starting April 1, 2018. BC will take measures to expand carbon pricing to include fugitive emissions and emissions from slash-pile burning.
<i>Alberta</i>	Alberta extended the reach of its carbon pricing system this year to increase coverage across the economy. Starting on January 1, 2017 a carbon levy applies to transportation and heating fuels that emit GHG emissions when combusted. The levy rate is currently \$20/tonne and will increase to \$30/tonne in 2018. Alberta's current Specified Gas Emitters Regulation will be also replaced in 2018 by an Output Based Allocation framework for large industrial emitters, which will regulate GHG emissions while protecting the competitiveness of Alberta's trade exposed industries.
<i>Manitoba</i>	Manitoba has proceeded with developing a Made-in-Manitoba Climate and Green Plan that includes carbon pricing and specific priorities for addressing climate change, jobs, nature, and water.
<i>Ontario</i>	Ontario launched a cap-and-trade program in January 2017 and held its first auction of emission allowances in March. Ontario's cap-and-trade regulations cover about 82% of emissions (including industry, electricity and fuels, excluding marine and aviation).
<i>Québec</i>	In 2013, the Québec government replaced its carbon levy with a cap-and-trade system that has been linked with California's system since 2014. During the first two years of the program, industrial emitters and electricity producers were covered. In 2015, the Québec government terminated its carbon levy, when fuel distributors became covered by the cap-and-trade system. By the end of 2017, Québec and California will have held a total of thirteen joint auctions of GHG emission allowances. Ontario is also committed to join, and by 2018, the three governments are expected to have completed the necessary steps to link their cap-and-trade systems.
<i>Nova Scotia</i>	In November 2016, Nova Scotia announced an Agreement-in-Principle with the federal government on clean growth and climate change. In March of 2017, Nova Scotia conducted stakeholder consultation on cap-and-trade design options, and continues to draft quantification, reporting and verification (QVR) regulations. Nova Scotia plans to develop cap-and-trade program regulations and launch the QVR program in 2018.

<i>New Brunswick</i>	New Brunswick committed to introducing a carbon pricing mechanism during the current session of the legislature.
<i>Prince Edward Island</i>	Prince Edward Island is evaluating carbon pricing mechanisms to determine which approach best meets provincial objectives. Feedback was solicited during provincial pre-budget consultations. A mechanism will be chosen in late 2017. Required legislation and program delivery tools will be prepared in 2018. The carbon pricing mechanism will be launched in 2018.
<i>Newfoundland and Labrador</i>	Newfoundland and Labrador began operationalising its <i>Management of Greenhouse Gas Act</i> , which provides a legislative framework to reduce GHG emissions from large industrial emitters. Newfoundland and Labrador's GHG Reporting Regulations were gazetted on March 7, 2017 and Administrative Penalty regulations on July 28, 2017. Large industrial facilities were required to report their emissions to the provincial government on June 1, 2017 and provide third party verifications by September 1, 2017. Moving forward, Newfoundland and Labrador will continue to develop further regulations to support the full implementation of the Act.
<i>Yukon</i>	Yukon has been working closely with the federal government to study the impacts of carbon pricing on its residents, businesses and industry, and how best to recycle revenue.
<i>Northwest Territories</i>	The Northwest Territories released a Carbon Pricing Discussion Paper in July 2017 and held public consultations from July to September 15, 2017. The Government of the Northwest Territories will use the input received to inform the design of a carbon pricing system and determine revenue recycling options. Once the carbon pricing system is determined, the next steps will include necessary legislation.
<i>Nunavut</i>	Nunavut has been working closely with the federal government to study the impacts of carbon pricing on Nunavummiut. The study will support Nunavut's policy decisions on carbon pricing and is expected to be complete in fall 2017.

MITIGATION

ELECTRICITY

<i>Increasing renewable and non-emitting energy sources</i>	<p>The federal government published draft regulations for the accelerated phase-out of coal-fired power by 2030, as well as natural gas fired electricity performance standards. Negotiations are ongoing between federal, provincial, and territorial governments on equivalency.</p> <p>Most provinces and territories advanced plans to increase clean electricity production, including new efficiency regulations in British Columbia, new programs and a renewable energy auction launched in Alberta, a new energy policy and action plan in Québec that aim to expand renewable energy, an enhanced net metering framework in Ontario, new plans to expand renewable energy in Saskatchewan, a new small-scale renewables program in New Brunswick, upgraded transmission lines to support wind</p>
---	---

	<p>power in Prince Edward Island, continued expansion of hydro in Newfoundland and Labrador and Manitoba, new efficiency investments and renewable energy R&D advancements in Nova Scotia, new work on power generation policy in Yukon, a new net metering policy in Nunavut, and a new draft energy strategy in Northwest Territories.</p> <p>Good progress is being made on negotiating the terms of \$9.2 billion in federal transfers to provinces and territories for green infrastructure, a portion of which will support clean electricity infrastructure.</p> <p>The federal government committed \$200 million to deploy emerging renewable energy technologies; a call for proposals will occur in late 2017 and the program will start in April 2018.</p>
<i>Connecting clean power with places that need it</i>	<p>Federal infrastructure funding will support new transmission lines. For example, the Canada Infrastructure Bank will invest at least \$35 billion over 11 years in large, transformative projects including electricity grid interconnections. Provinces and territories will receive \$9.2 billion through Integrated Bilateral Agreements for priority green infrastructure projects, which could include better-connected electricity systems.</p> <p>Under the Government of Canada's Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI), federal, provincial, and territorial governments and utilities are collaborating on regional studies to identify the most promising electricity infrastructure projects with the potential to achieve significant emissions reductions. Key projects include natural gas sector electrification in British Columbia, new non-emitting generation projects, and enhancement of transmission interties between jurisdictions.</p> <p>Ontario and Québec, and Manitoba and Saskatchewan, respectively, have signed agreements to increase energy transmission across provincial boundaries.</p>
<i>Modernizing electricity systems</i>	<p>The federal government committed \$100 million for smart grid deployment and demonstration; a call for proposals will occur in late 2017 and the program will start in April 2018.</p> <p>Alberta is studying how to integrate more small-scale generation into its grid. Ontario is looking to expand its Smart Grid Fund and is also supporting microgrid demonstration projects. New Brunswick is looking to deploy advanced metering infrastructure. Prince Edward Island is studying how to maximize benefits from renewable generation, and Atlantic Provinces announced the Atlantic Clean Energy Partnership to enhance electricity infrastructure in the region.</p>
<i>Reducing reliance on diesel working with Indigenous Peoples and northern and remote communities</i>	<p>The federal government has allocated \$220 million to fund projects that help reduce reliance on diesel; a call for proposals will occur in late 2017 and the program will start in April 2018. One of the challenges launched under the Clean Technology Stream of the Impact Canada Initiative will also support northern and remote communities to reduce their reliance on diesel.</p> <p>The provincial-territorial Pan-Canadian Task Force on Reducing Diesel Use on Off-Grid Communities met to develop a common vision for remote energy use and recommended federal, provincial, and territorial collaboration to find common solutions.</p> <p>Alberta announced \$35 million to fund community and solar energy projects in</p>

Indigenous communities. British Columbia is working with remote and off-grid communities to assess options. Manitoba is expanding geothermal and biomass in northern communities. Northwest Territories is setting a target for reducing diesel use and is working to expand solar and wind in remote communities. Nunavut is actively exploring opportunities for improving the energy efficiency of its diesel generators. Yukon is supporting its First Nations and communities improve energy efficiency and expand renewable energy.

BUILT ENVIRONMENT

Making new buildings more energy efficient

The federal government allocated \$99 million to develop **net-zero energy ready** building codes, including funding for RD&D projects. A number of provinces took steps to increase energy efficiency requirements for new buildings, including a new voluntary step-code in British Columbia, building code updates in Manitoba, adoption of the National Building Code by Prince Edward Island, and proposed coordination on codes and standards with British Columbia and California, Oregon and Washington. Alberta is undertaking a feasibility study to ensure that sustainable technologies are applied to new-build and retrofit projects to reduce emissions.

Retrofitting existing buildings

Most jurisdictions are **supporting energy efficiency** through policies, programs or incentives. The governments of the Atlantic provinces announced the Atlantic Clean Energy Partnership, which will promote energy efficiency, among other priorities. New Brunswick continues to invest in energy efficiency programs, including a retrofit program for low-income earners. Newfoundland and Labrador allocated \$5 million for a Home Energy Savings Program and \$4 million for a Home Energy Efficiency Loan Program. Prince Edward Island continues to offer programs to help Islanders reduce energy consumption, and is developing a district heating system. Manitoba is establishing a new crown corporation to deliver energy efficiency programs and services.

The federal government allocated \$82.5 million to support energy **benchmarking, standards and labelling**. Federal, provincial, and territorial governments are working together to develop a national framework and online tool for measuring and sharing energy use data. Ontario has introduced new reporting and benchmarking rules for energy and water. It is also working to build programs to help hospitals, universities and colleges retrofit their facilities with energy efficient and renewable energy technologies. British Columbia plans to implement new performance standards to meet new energy efficiency targets.

Federal, provincial, and territorial governments are working together to identify building retrofit projects as part of the \$2 billion Low Carbon Economy Fund. Governments are also finalizing details of \$9.2 billion in federal transfers as part of the Investing in Canada Infrastructure Program, a portion of which will support efforts to increase energy efficiency in new and existing public infrastructure.

Ontario announced a partnership with the Integrated Electricity System Operator's Conservation Fund for an assortment of projects, from fuel cells for space and water heating to net-zero energy buildings. Ontario is also supporting the MaRS Discovery District in piloting the Green Building Certifications Inc.'s Investor Confidence Project protocols in the province and exploring how they can be adapted for the Canadian Market. Alberta is investing in government-owned building refits to increase the efficiency of mechanical and electrical equipment. Where feasible, solar panels are also being installed as part of the refit project to reduce demand on the electricity grid. The province also has approved a solar program for schools across the province.

	<p>Québec extended the RénoVert tax credit for an additional year, which will support household investments in the environmentally friendly home renovation sector and, as a result, increase demand for products and construction materials that meet recognized environmental and energy efficiency standards.</p>
<p><i>Improving energy efficiency for appliances and equipment</i></p>	<p>Federal, provincial, and territorial Energy and Mines Ministers released a strategy that sets energy performance goals for windows, space and water heating. Roadmaps will be developed for these goals in 2018.</p> <p>The federal government amended the <i>Energy Efficiency Regulations</i>, updating efficiency standards for 20 product categories, with further updates for 17 more products expected in early 2018. British Columbia took regulatory action to allow utilities to increase incentives for high-efficiency equipment and also took steps to enhance standards for gas fireplaces and heat pumps. Ontario continued to update and set new efficiency standards for products. Québec tightened its energy efficiency standards for appliances. The federal government allocated \$6 million annually to support energy efficiency standards and the ENERGY STAR program for equipment.</p>
<p><i>Supporting building codes and energy efficient housing in Indigenous communities</i></p>	<p>The Government of Canada is planning a joint research project with the National Research Council to define guidelines to support sustainable housing in First Nations communities. Northwest Territories has committed over \$2.7 million to provide energy efficiency programs and services to residents, businesses and communities.</p>

TRANSPORTATION

<p><i>Setting standards and improving efficiency</i></p>	<p>The federal government continues to implement emissions standards for new light- and heavy-duty vehicles. In March 2017, draft amended regulations to implement emissions standards for heavy-duty vehicles were published in the <i>Canada Gazette, Part I</i>.</p> <p>The federal government has made significant investments for transportation initiatives, such as in fuel-efficient tire standards, freight best practices, and the National Trade Corridors Fund (NTCF) for infrastructure to help reduce congestion and idling.</p> <p>Canada is also taking action to improve efficiency and support fuel switching in the rail, aviation and marine sectors. This includes voluntary action plans to reduce GHG emissions and increase engine efficiency in the rail and aviation sectors.</p> <p>Canada is also working to reduce aviation-related emissions by implementing the internationally agreed carbon dioxide (CO₂) standard, working with international partners to finalize a revised non-volatile particulate matter (nvPM) standard, and to finalize and implement the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).</p> <p>Jurisdictions are taking collective action on a path forward for establishing retrofit requirements for heavy-duty vehicles. This year the federal government initiated preliminary research and analysis, which builds upon existing provincial and territorial efforts in their own jurisdictions. Federal, provincial, and territorial governments are developing a work plan to consider options for encouraging greater use of fuel saving devices. In 2017, New Brunswick's climate change action plan recognized heavy-duty vehicle retrofits as an action that will contribute to emission reductions, while Ontario and Québec announced funding for programs that support the adoption of fuel-saving devices.</p>
--	---

	<p>A number of jurisdictions also took action to improve efficiency and support fuel switching in the rail and marine sectors.</p> <p>Many other governments continued their work to reduce emissions from the transportation sector, including Québec's regulation respecting GHG emissions for motor vehicles, British Columbia's 10-year transportation plan and increased provincial funding for transit, and Prince Edward Island's Enhancing Active Transportation Networks program and Sustainable Transportation Committee.</p>
<p><i>Putting more zero-emission vehicles on the road</i></p>	<p>A Federal-Provincial-Territorial Steering Group is overseeing the development of a Canada-wide strategy for zero-emission vehicles (ZEVs). Together, governments have established several collaborative expert groups to provide advice on the development of a national strategy, expected to be finalized in 2018.</p> <p>British Columbia launched clean energy vehicles (CEV) charging infrastructure subsidy programs and a procurement program for electric vehicle (EV) charging stations. BC is also enabling utilities to invest up to \$330 million to provide incentives for natural gas use in the heavy duty vehicle sector, including renewable natural gas and refueling infrastructure in the marine sector. Alberta is looking into barriers to ZEV adoption. Manitoba is expanding the use of electric buses. Ontario continues to expand its suite of ZEV incentive, information and pilot programs. Québec tabled draft regulations for a ZEV standard and has set a target to put 100 000 ZEVs on the road by 2020. New Brunswick installed 15 new EV charging stations and 10 fast chargers. Prince Edward Island purchased the first EV for its government fleet, and is in the midst of an education campaign on the benefits of EVs. Newfoundland and Labrador released a Vehicle Efficiency and Cost Calculator to inform consumers about the costs and benefits associated with purchasing a fuel efficient and alternatively powered vehicle.</p> <p>The federal government allocated \$62.5 million in Budget 2016 (Phase 1) and \$120 million in Budget 2017 (Phase 2) to support the deployment, demonstration, and development of enabling codes and standards for recharging and alternative fuels infrastructure. By March 2018, Phase 1 will be complete, resulting in the construction of over 100 new EV fast chargers, seven natural gas stations, and three hydrogen stations. It will also result in the demonstration of more than 200 next-generation EV charging stations in real-world settings, including public transit, passenger and heavy-duty vehicles, multi-unit residential building and wireless charging applications.</p>
<p><i>Shifting from higher- to lower-emitting modes and investing in infrastructure</i></p>	<p>Québec, Ontario, New Brunswick, Alberta, and British Columbia developed action plans that incorporate commitments and/or funding for infrastructure improvements that facilitate efficient multi-modal transportation or ensure transportation infrastructure is resilient and adapted to the effects of the changing climate. Nova Scotia, New Brunswick, Manitoba, and Québec have signaled their commitment to electrifying transportation.</p> <p>British Columbia developed a 10-year transportation plan and increased funding for transit; Alberta committed \$1.53 billion to the Calgary Green Line LRT, an additional \$176 million for a total of \$600 million to support the Southeast Valley Line LRT in Edmonton as well as \$305 million for municipal transit; and Prince Edward Island is expanding its sustainable and active transportation infrastructure.</p> <p>The Public Transit Infrastructure Fund is investing \$3.4 billion over three years to upgrade and improve public transit systems across Canada including investments in energy efficient buses, increasing accessibility of public transit, integrating alternative and active transportation into public transit systems and repairing transit infrastructure.</p>

	Through the \$2 billion, 11 year National Trade Corridors Fund, Canada is also supporting investments in transportation infrastructure – including ports, airports, railways, border crossings – to address urgent capacity constraints and freight bottlenecks to strengthen the efficiency and reliability of trade-related transportation systems in Canada.
<i>Using cleaner fuels</i>	The federal government published a discussion paper to inform development of a clean fuel standard to reduce emissions from fuels used in transportation, buildings and industry. British Columbia amended the <i>Greenhouse Gas Reduction (Clean Energy) Regulation</i> to support the use of renewable natural gas. Québec is requiring 2% renewable content in diesel and 5% in gasoline. Saskatchewan, New Brunswick, and Ontario are investigating renewable and low carbon fuel options.

INDUSTRY

<i>Reducing methane and HFC emissions</i>	<p>The federal government published draft regulations to reduce methane emissions from the oil and gas sector, based on close collaboration with provincial and territorial governments on the approach. The federal government is also working to publish final regulations on the phase down of hydrofluorocarbons (HFCs).</p> <p>Provinces and territories have also been active to reduce methane and HFCs. British Columbia has a pilot for a Clean Infrastructure Royalty Credit Program and the Greenhouse Gas Industrial Reporting and Control Act for liquid natural gas emissions intensity benchmarks. Alberta is using emission offset protocols to reduce industrial methane emissions, including the Quantification Protocol for Greenhouse Gas Emission Reductions from Pneumatic Devices. Saskatchewan, Newfoundland and Labrador and Québec continue their work in this area.</p>
<i>Improving industrial energy efficiency</i>	<p>New Brunswick is expanding its industrial energy efficiency programming. Northwest Territories is assessing the potential for industrial efficiency improvements, and Newfoundland and Labrador is setting performance standards to reduce GHG emissions from large industry.</p> <p>The federal government launched the new ENERGY STAR for Industry certification and challenge programs, and is working with British Columbia to provide joint incentives to implement ISO 50001 energy management systems.</p> <p>The Commission for Environmental Cooperation (CEC) North American Energy Management Pilot equipped industrial companies across North America with resources to reduce energy consumption and GHG emissions.</p>
<i>Investing in technology</i>	<p>The federal government is investing \$50 million in oil and gas sector technologies to reduce GHG emissions, including a \$10 million investment in the Alberta Carbon Conversion Technology Centre.</p> <p>British Columbia launched a Technology Strategy, \$100 million Tech Fund and a \$27 million Cement Low Carbon Fuel Program, and made a commitment to establish an Emerging Economy Task Force and Innovation Commission. Québec invested in technology and innovation in several sectors including electric vehicles and green technology.</p>

FORESTRY, AGRICULTURE AND WASTE

<i>Increasing stored carbon</i>	The \$2 billion Low Carbon Economy Fund announced by the federal government supports new and expanded provincial and territorial actions to reduce GHG emissions,
---------------------------------	---

	<p>including through enhanced carbon storage in forests and agricultural soils. Approved provincial/territorial projects under the Low Carbon Economy Leadership Fund will launch in 2018.</p> <p>British Columbia announced a \$150 million investment to enhance the carbon storage potential of its public forests, and is also developing new tools for environmental farm management. Northwest Territories has launched a Forest Industry Development Strategy to provide guidance on further developing the forest industry. New Brunswick, Québec, British Columbia, and Alberta have been combatting pest epidemics through early intervention and monitoring, reforestation, and ongoing treatment of affected areas to limit the damage to forest health.</p> <p>The Québec –Ontario Cooperation for Agri-Food Research Program is funding collaborative research on climate change impacts on soil health, food processing and food safety in order to develop best practices and adaptation and mitigation strategies.</p>
<i>Increasing the use of wood for construction</i>	<p>Federal, provincial, and territorial governments have made significant investments to increase the use of wood in construction. The federal government is investing \$39.8 million over four years in the Green Construction through Wood Program.</p> <p>Ontario is investing \$4.8 million for the Mass Timber Building Project and Québec is investing \$11 million for the Wood Building Demonstration Program.</p> <p>A number of jurisdictions including Alberta, British Columbia, New Brunswick, and Québec have Wood Charters or wood use policies that encourage the use of wood products in construction, and some provinces are increasing the use of wood and other low-carbon renewable materials in municipal and government-funded buildings. Some jurisdictions are also allocating funds for research, demonstration projects, and training programs on wood construction.</p>
<i>Generating bioenergy and bio products</i>	<p>Action has been taken to bring cleaner bioenergy to communities that rely on fossil fuels, including through federal investments of \$55 million in support of bioheating as part of the federal Promoting Clean Energy for Remote Communities program.</p> <p>Ontario's Wood Stove Exchange Program will offer financial incentives to homeowners in northern, rural, and Indigenous communities to replace existing wood heating or fossil fuel appliances with new, high-efficiency, modern wood heating systems. The Whitesand First Nation in Ontario aims to replace diesel power generation by constructing a combined heat and power cogeneration plant and a wood pellet plant.</p> <p>Jurisdictions are also investing to increase Canada's competitiveness in bioproducts and biofuels. Yukon invested \$187,000 to support biomass development and New Brunswick launched a Forest Biomass Policy for companies to harvest biomass for either energy production or fuel production. Québec is leading the transformation and modernization of its forest products industry through, for example, its Wood Innovation Work Plan with over \$86 million in government investments by 2022. Alberta has supported bioenergy and biofuels through investment in the Bioenergy Producer Program and development of emission offset protocols including the Biofuel Production and Usage Protocol and Energy Generation from Biomass Protocol.</p>
<i>Advancing innovation in GHG-efficient management practices in forestry and agriculture</i>	<p>The federal government has committed to invest in research and innovation to support the agriculture industry, including \$70 million for science and innovation with a focus on climate change and soil and water conservation, \$25 million for adoption of clean technology by Canadian agricultural producers, \$27 million for innovative projects to help farmers mitigate GHG emissions and \$2.35 million to attract youth to green jobs</p>

within the agriculture and agri-food sector. The federal government is also helping evaluate potential climate impacts on regional agricultural production to build risk mitigation tools and support adaptation.

The Canadian Council of Forest Ministers released a Forest Bioeconomy Framework for Canada to promote the use of forest biomass for advanced bioproducts and advance innovation in the forest sector.

Provincial and territorial governments have also taken action within their jurisdictions. Alberta has a number of agriculture programs to address climate change, Saskatchewan continues to invest in research and development, New Brunswick is researching carbon sequestration in agriculture, Nova Scotia is hiring an on-farm energy auditor to reduce agriculture's carbon footprint, and Manitoba, Ontario, and Québec are developing a range of new programming related to agriculture and climate change. Yukon and Northwest Territories are assessing the impacts of climate change on agriculture and traditional foods in the north.

GOVERNMENT LEADERSHIP

Setting ambitious targets

The federal government has committed to reducing its GHG emissions by 40% by 2030, or earlier. Public reporting in July 2017 showed that federal GHG emissions decreased by 19% between 2005-06 and 2014-15.

In 2017, Canada released its GHG emissions inventory of federal operations online and will continue to report on progress.

Other actions from jurisdictions include Manitoba's work to benchmark building energy and water use for government buildings, Newfoundland and Labrador's greening government action plan, Nova Scotia's policies to reduce emissions, Nunavut's internal assessments of operations, Saskatchewan's certification of green buildings and New Brunswick's update of its green building policy.

Cutting emissions from government buildings and fleets

The federal government is investing in actions to reduce its emissions, including \$1 billion to modernize heating and cooling plants in the National Capital Region, and \$29.7 million for technical support to help federal organizations cut GHG emissions from their buildings and fleets. British Columbia continues its commitment to be a carbon neutral government and has also launched a *Wood First Act*, a LEED Gold equivalent requirement for public sector buildings, and an EV charging infrastructure procurement initiative. New Brunswick is retrofitting public buildings and purchasing plug-in hybrid vehicles for its fleet. Québec plans to reduce the petroleum fuel consumption of the governmental and para-governmental light vehicle fleet. Under Newfoundland and Labrador's Build Better Buildings Policy, new buildings strive for LEED Silver status. Northwest Territories has set a target for all new government buildings to exceed the National Energy Code for Buildings by 10%.

Scaling up clean procurement

The Government of Canada allocated \$29.9 million to offer services supporting greening government operations.

Québec has committed to developing a tool to guide public procurement. As well, it has developed a plan for integrating eco-responsible performance criteria into public bidding processes, in order to increase the volume of environmentally responsible acquisitions in the public service.

INTERNATIONAL LEADERSHIP

Delivering on Canada's international climate finance commitments

Canada is taking an innovative approach to mobilizing private sector financing and partnering with multilateral development banks to help remove barriers to private investment. In 2017, Canada announced the \$200 million second phase of the Canadian Climate Fund for the Private Sector in Asia, administered by the Asian Development Bank. In 2018, Canada will finalize and announce additional agreements with partners to deliver and implement Canada's climate finance commitment. It is expected that all agreements with partners will be finalized by the end of Fiscal Year 2020-21.

Québec decided to respond directly to the appeal by the United Nations to increase the international funding of climate actions in developing countries by announcing climate cooperation measures totalling \$25.5 million, mainly for Francophone countries that are most vulnerable to the impacts of climate change.

Acquiring internationally transferred mitigation outcomes

The International Mitigation Project Team completed work to assess opportunities and risks and to provide considerations to inform Canada's approach to internationally transferred mitigation outcomes (ITMOs). The International Mitigation Project Team report will be presented to Ministers of Environment at their 2017 meeting.

Engaging in trade and climate policy

This year, Canada co-sponsored a workshop on trade and climate change that was held on the margins of the World Trade Organization (WTO) Committee on Trade and Environment (CTE). The federal government continues to advance discussions on trade and climate change in the WTO, Organization for Economic Cooperation and Development (OECD), and other international organizations. Saskatchewan began work to investigate opportunities for offsets and ITMOs and to contribute to the development of Carbon Capture and Storage international standards.

In June 2017, Canada's Feminist International Assistance Policy was launched, with Environment and Climate Action as a key area for action. The Policy recognizes that communities around the world, particularly the poorest and most vulnerable, are experiencing the destabilizing effects of climate change and reaffirms Canada's commitment to combatting climate change and its impacts.

Canada is leading and partnering to advance international initiatives under the Clean Energy Ministerial related to women in clean energy, energy efficiency (in industry, buildings, and appliances), electric vehicles, and smart grids. In 2019 Canada will host the Clean Energy Ministerial/Mission Innovation for the first time. By hosting this ministerial event, Canada is positioning itself as a global leader on clean energy and innovation and showcasing Canadian clean energy solutions, providing business opportunities for Canadian clean energy companies.

ADAPTATION AND CLIMATE RESILIENCE

TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION

Providing authoritative climate information

The federal government has announced funding and is working with partners to develop the Canadian Centre for Climate Services. The Centre will provide authoritative climate information, data and tools to support adaptation decision-making in Canada.

Provinces and territories are advancing efforts to equip Canadians with the information they need, including future climate projections in British Columbia, LiDAR imaging data in New Brunswick, information and resources to support

	adaptation decision-making in Nunavut, regional climate modelling, monitoring, and updated Intensity Frequency and Duration Curves in Ontario, and climate-scenario research and services in Québec.
<i>Building regional adaptation capacity and expertise</i>	<p>The federal government has announced funding and is consulting with stakeholders to develop the Building Regional Adaptation Capacity and Expertise program.</p> <p>Provinces and territories are collaborating to build capacity on a regional basis (e.g., Atlantic and western provinces). Québec provided \$12.7 million over three years to the Ouranos Consortium to support multidisciplinary applied research projects on climate change impacts, vulnerabilities and the development of adaptation solutions. Manitoba is providing \$400,000 for the creation of the Prairie Climate Centre to develop climate data to inform decision-making and address climate impacts.</p>

BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE

<i>Investing in infrastructure to build climate resilience</i>	<p>The federal government has launched the Investing in Canada Plan, which will provide \$9.2 billion to provinces and territories through Integrated Bilateral Agreements, including projects supporting adaptation and resilience; and \$2 billion through the Disaster Mitigation and Adaptation Fund.</p> <p>The federal government also launched the \$16.35 million Transportation Assets Risk Assessment initiative to support those responsible for federal transportation infrastructure assets in identifying and better understanding the climate risks to their assets, and the potential adaptation solutions that could be employed to reduce them.</p>
<i>Developing climate-resilient codes and standards</i>	<p>The federal government, in delivering the Climate Resilient Buildings and Core Public Infrastructure Project, is undertaking work to integrate climate resilience into new buildings and core public infrastructure, and is facilitating development of updated guidance and standards to support climate-resilient infrastructure decision-making.</p> <p>British Columbia, Alberta, New Brunswick, Northwest Territories, Nova Scotia, Nunavut, and Ontario are supporting the federal government in the development of climate-resilient codes and standards, including building codes and guidelines that support climate-resilient infrastructure decision-making within their jurisdictions.</p>

PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING

<i>Addressing climate change-related health risks</i>	<p>With partners and stakeholders, the federal government has taken concrete actions to prevent and prepare for heat-related illnesses. This includes the launch of a National Heat Health Community of Practice with key stakeholders, formally tabled Federal Framework on Lyme Disease and action plan. The government continues to increase capacity to prevent, identify, and manage climate-driven infectious diseases as well as engage with key partners to support health research, monitoring and surveillance. In addition, the first call for proposals under the Infectious Diseases and Climate Change Fund was issued to address the impact of climate change on human health by building and increasing access to infectious disease-based evidence, education and awareness.</p> <p>Provinces and territories are advancing efforts to protect human health. Québec, New Brunswick and Manitoba are taking steps towards developing surveillance and warning systems for heat. Québec has supported research to link the problem of zoonosis in the context of climate change and made efforts towards providing health authorities with tools to track adaptation to climate change. Yukon is monitoring the</p>
---	--

	health impacts of extreme weather events and wildfires and Nunavut has increased awareness of the human risks associated with climate change in Nunavut.
<i>Supporting healthy Indigenous Peoples</i>	The federal government has supported community-based health adaptation with First Nations, Inuit and the Métis Nation.

SUPPORTING PARTICULARLY VULNERABLE REGIONS

<i>Investing in resilient infrastructure to protect vulnerable regions</i>	<p>The federal government continues to engage Northern jurisdictions and stakeholders under the Northern Transportation Adaptation Initiative, and announced funding under the Investing in Canada Plan that will build resilience in vulnerable regions (i.e., Indigenous, coastal and northern communities).</p> <p>Provinces and territories are advancing efforts to improve flood protection, including Manitoba's commitment to invest \$1 billion annually to improve flood protection, Yukon's monitoring and surveillance of transportation infrastructure, Nova Scotia vulnerability assessments to inform dyke maintenance, and New Brunswick's adaptation planning. Newfoundland and Labrador, Prince Edward Island, Northwest Territories, and Nunavut are supporting climate-resilient infrastructure in vulnerable regions.</p>
<i>Building climate resilience in the North</i>	<p>The federal government is working with provinces, territories, northern governments and Indigenous organizations to finalize the Northern Adaptation Strategy and continues to make investments through the Climate Change Preparedness in the North program to strengthen northern adaptation capacities. The federal government renewed the Northern Transportation Adaptation Initiative to continue to build northern capacity and support the research and development of new tools and technologies for adapting northern transportation to climate change.</p> <p>Ontario and Quebec, are improving the resilience of northern infrastructure, including transportation infrastructure, to the impacts of climate change. Manitoba is facilitating the sharing of information and local knowledge in northern communities. Québec is monitoring ice movements along Nunavik coast and supporting projects to improve the resiliency of transportation infrastructure. The Northwest Territories is supporting adaptation planning in the North.</p>
<i>Supporting community-based monitoring by Indigenous Peoples</i>	<p>The federal government launched a new program to support community-based monitoring and the pairing of Indigenous Knowledge and western science.</p> <p>Provinces and territories are working in close collaboration with Indigenous Peoples to support community-based monitoring and the sharing of Indigenous Knowledge. This has included efforts to support intergenerational dialogue with students in Nunavik in Québec, monitoring of traditionally harvested foods in Saskatchewan, building technical capacities of Indigenous Peoples in Ontario, and supporting community-based monitoring activities in Alberta, the Northwest Territories, and Nunavut.</p>
<i>Supporting adaptation in coastal regions</i>	<p>The federal government will continue to provide scientific information and data to inform and improve predictions of climate change in vulnerable coastal regions through the renewal of the Aquatic Climate Change Adaptation Services Program.</p> <p>Provinces and territories are supporting efforts to identify and assess the vulnerability of coastal communities and infrastructure. British Columbia is updating flood plain maps and developing a Flood Hazard Strategy. Newfoundland and Labrador and Yukon are improving monitoring capabilities in coastal regions in. New</p>

Brunswick, Northwest Territories, Prince Edward Island, Nunavut, and Québec are completing vulnerability assessments and/or supporting adaptation planning in coastal communities.

REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS

Investing in infrastructure to reduce disaster risks

The federal government, through the Investing in Canada Plan, will prioritize investments in infrastructure to reduce disaster risks and protect communities and continues to support provinces and territories through the National Disaster Mitigation Program including British Columbia and Newfoundland and Labrador.

Alberta and Ontario are advancing efforts to support municipalities and communities in building long-term resilience to flooding and drought events. Quebec is developing a framework (Cadre pour la prévention des sinistres 2013-2020) that helps municipalities prevent disasters, coastal erosion and landslides through adaptation planning. Nunavut is sharing best practices. Manitoba, New Brunswick, and Northwest Territories are prioritizing investments in infrastructure.

Advancing efforts to protect against floods

Under the National Disaster Mitigation Program, the federal government has advanced efforts to protect against floods, including the development and modernization of flood maps, the publication of the Floodplain Mapping Guidelines, and support for Alberta, Manitoba, New Brunswick, Prince Edward Island, and Saskatchewan in assessing flood risks.

Alberta, British Columbia, Manitoba, Saskatchewan, Nova Scotia, Newfoundland and Labrador, the Northwest Territories, and Québec have supported flood risk mapping, adaptation planning, monitoring and flood risk assessments to better understand, address and reduce flooding risks within their jurisdictions.

Supporting adaptation by Indigenous Peoples

The federal government continues to support the integration of climate information into decision-making processes through the First Nation Adapt program. The program works with First Nation communities to identify region-specific priorities, impacts and opportunities for climate change projects. The program prioritizes First Nation communities most impacted by climate change related to sea level rise, flooding, forest fires, and winter road failures. The program was expanded in 2017 to include a focus on floodplain mapping on-reserve.

Some provinces and territories are supporting Indigenous Peoples by supporting community-based monitoring of sea-ice in Nunavut, assessing the political processes and governmental structures for adaptation in Nunavik in Québec, and by providing training for community climate change champions in Yukon.

CLEAN TECHNOLOGY, INNOVATION AND JOBS

BUILDING EARLY-STAGE INNOVATION

Supporting early-stage technology development

Federal, provincial, and territorial governments are supporting new approaches to early-stage technology development to advance research in areas that have the potential to substantially reduce GHG emissions and other pollutants. For example, the new Clean Growth Hub announced through Budget 2017 supports several clean

technology actions across all stages of the innovation spectrum, including at the early-stage technology development.

The Federal-Provincial-Territorial Working Group on Clean Growth is working to identify breakthrough technology missions or challenge areas of new programs such as the clean technology stream of Impact Canada and other similar initiatives.

Provinces and territories are also taking action to build early-stage innovation. Examples include Ontario's newly launched challenge to innovators to propose solutions to help Ontario industry reduce GHG emissions and its new program to fund costs of large-scale transformative research. Québec has a new Research and Innovation Strategy (SQRI) – Oser innover [Dare to Innovate] and is working under the Energy Policy's 2017-2020 action plan to achieve a 25% increase in the number of technological innovation projects, funded between now and 2020. In May 2017, Québec also launched a \$3 million call for proposals to create a research chair for the development of green technologies.

Mission-oriented research and development

The Government of Canada allocated \$200 million in Budget 2017 to support clean technology research and the development, demonstration and adoption of clean technology in Canada's natural resources sectors. The Federal-Provincial-Territorial Working Group on Clean Growth is working to identify breakthrough technology missions or challenge areas of new programs and to map existing assets, programs and infrastructure supporting mission-oriented RD&D. Alberta and the federal government are collaborating through the Alberta-Canada Collaboration on Clean Energy Research and Technology and the Energy Innovation Program to support new and clean technologies. Ontario recently launched the Low Carbon Innovation Fund (LCIF) to help researchers, entrepreneurs and companies create and commercialize new, globally competitive, low-carbon technologies that will help Ontario meet its GHG emissions reductions targets. Alberta recently announced the Oil Sands Innovation challenge to reduce GHG emissions and improve cost competitiveness of bitumen production and announced funding commitments to 12 innovative methane-reducing technology projects.

ACCELERATING COMMERCIALIZATION AND GROWTH

Access to government programs

The new federal government Clean Growth Hub is working to improve client service and clean technology policy coordination across Canada. The Federal-Provincial-Territorial Working Group on Clean Growth is developing a new national network of clean technology incubators and accelerators. Québec and the federal government partnered to offer services, namely through Entreprises Québec and Infos Entrepreneurs, to assist entrepreneurs.

Increasing support to advance and commercialize innovative technologies

Federal, provincial, and territorial governments are working together to enable access to capital for clean technology businesses to bring their products and services to market. The federal government is supporting access to capital to help Canada's clean technology firms grow and expand through growth and project financing, funding projects across Canada to develop and demonstrate new clean technologies that promote sustainable development, and through a suite of innovation initiatives in Budget 2017 to support Canada's innovators. Alberta is working with Business Development Bank of Canada on how to draft letters of intent, British Columbia and the federal government recently announced a partnership between the Innovative

	<p>Clean Energy (ICE) Fund and the SD Tech Fund™ to support the development of pre-commercial clean energy projects and technologies, and Québec is working with SDTC to support innovation in energy and in GHG emissions reduction in Québec as well as with Ecofuel Accelerator to support start-up companies working in the clean technology sector, and Nova Scotia and the Atlantic Canada Opportunities Agency (ACOA) announced new support for Nova Scotia start-ups in the ocean and clean technology sectors. Québec also announced a new innovation assistance program which will cover development and commercialization of new clean technologies. Ontario is currently developing a CleanTech Strategy and has made significant investments into its cleantech network. New work was recently announced by firms in Alberta, British Columbia, and Ontario working to advance technology solutions for reducing GHG emissions and increasing energy efficiency in Canada's oil sands.</p> <p>Ontario's Cleantech Equity Fund initiative is a \$55 million investment that will focus on providing venture capital to high potential, innovative Ontario-based cleantech businesses.</p>
<i>Strengthening support for skills development and business leadership</i>	<p>Federal, provincial, and territorial governments are working together to strengthen skills development and business-leadership capacity through a number of efforts. The Federal-Provincial-Territorial Working Group on Clean Growth is collaborating with other working groups to share information to support talent, skills training and development opportunities. Saskatchewan engaged the tech sector on skills shortages in ICT, Québec developed a labour market strategy addressing clean tech sector needs, Ontario invested to help Indigenous communities address climate change and support economic growth and the adoption of clean technology solutions, and British Columbia held job fairs in Silicon Valley to attract high-skills talent.</p>
<i>Expedite immigration of highly qualified personnel</i>	<p>The Government of Canada's new Global Skills Strategy gives employers a faster and more predictable process for attracting top talent and new skills to Canada and the new Global Talent Stream allows companies access to a new streamlined hiring process. Québec is offering tax breaks for foreign researchers and experts to help businesses find employees with high-level skills needed to carry out their innovation projects.</p>
<i>Promoting exports of clean technology goods and services</i>	<p>The Government of Canada is working on an international business development strategy to support Canadian clean technology firms to become world leaders and capitalize on global market opportunities. The Federal-Provincial-Territorial Working Group on Clean Growth is working to establish a Pan-Canadian approach for clean technology export support to increase Canadian clean technology exports and growth of globally competitive Canadian clean technology producers, and is also working to develop Canada's clean technology value proposition for foreign-direct investment targets. The federal and provincial governments are investing to provide Atlantic firms with training, intelligence and market analysis and in-market engagement activities through the Atlantic Trade and Investment Growth Strategy.</p> <p>British Columbia is collaborating with Washington State to establish the Cascadia Innovation Corridor to help grow the high-tech, life sciences, clean technology, and data analytics industries across borders. Québec launched the 2016-2020 Québec Export Strategy which identifies priority actions to support the clean technology sector and the International Climate Cooperation Program to support the transfer, adoption and deployment of clean technologies to developing Francophone countries vulnerable to the impacts of climate change.</p>

Standards-setting

The Government of Canada is supporting the Standards Council of Canada (SCC) to develop a strategy to support Canadian clean technology entrepreneurs through the use of standards to accelerate commercialization, time to market and secure access to a wider range of market. Ontario recently released a Cleantech Strategy to streamline industry standards.

FOSTERING ADOPTION

Leading by example: greening government operations

Work is underway by federal, provincial, and territorial governments to develop action plans for greening government operations and encourage utilities and municipalities and other public sector entities to adopt clean technologies to lead by example.

The federal government launched Innovative Solutions Canada (TBC), a new innovation procurement program to enhance early stage clean technology R&D and clean technology innovation.

The Federal-Provincial-Territorial Working Group on Clean Growth is working to promote innovation and better connect clean technology producers to opportunities. The working group is also developing a procurement resource toolkit for municipalities, universities, schools and hospitals to help them leverage existing green procurement initiatives or adopt similar practices.

The Atlantic Energy Gateway (AEG) is working to contribute to the development of Atlantic Canada's clean energy resources by identifying the opportunities and assisting in evaluating the advantages of the region's substantial and diversified renewable energy potential for wind, tidal, biomass/biofuels, and hydro.

Most provinces and territories are taking action to reduce emissions by greening government operations. British Columbia implemented the Carbon Neutral Government program and created a procurement concierge service to connect commercial-ready vendors to government buyers. British Columbia is working on policy options for increasing the use of low carbon building materials in new LEED certified public sector facilities. Saskatchewan is undertaking research and experiments into drought resistant cropping and the vulnerability of forests to climate change. Manitoba has a GHG emissions summary of government buildings and new guidelines for construction waste diversion and building air-leakage testing. Ontario is supporting technology-driven small and medium-sized enterprises (SMEs) and the procurement and adoption of Ontario Clean technologies. Québec developed a plan for integrating eco-responsible performance criteria into public bidding processes and tools to promote public procurement of clean technologies. Québec is also investing in renewable energies for heating for schools and investments to improve energy efficiency. New Brunswick has a green procurement policy. Newfoundland and Labrador is working to accredit public buildings under the LEED sustainable buildings rating system. Prince Edward Island is striving to reach 100% renewable energy production within the province by 2050 and is reviewing 20 potential Innovative Energy Projects. Northwest Territories is promoting energy efficiency retrofits and biomass heating systems in government buildings, and Nunavut is studying potential options to green government operations.

Supporting Indigenous Peoples and northern and remote communities to adopt and adapt clean technologies

The Government of Canada and Ontario are working together to fund a new biomass and wood processing facility for Whitesand First Nation that will provide clean energy and jobs. The Government of Alberta is supporting Alberta Indigenous communities or Indigenous organizations to install solar photovoltaic systems on facilities owned by the community or organization. Manitoba co-hosted a Pan-Canadian Summit on Reducing Diesel in Remote Communities to identify options to improve access to diesel

alternatives in Northern, remote and Indigenous communities. Québec has multiple initiatives underway, including a pilot project for energy recovery of residual materials in northern areas and the Residual Forest Biomass Program to promote the use of biomass instead of fossil fuels and announced the creation of a fund dedicated to promote the use of biomass in the north to replace fossil fuels. The province also committed to forming an advisory council for Aboriginal communities to improve consultation on energy issues. Nunavut continues to explore options that reduce dependence on fossil fuels for all of its remote communities.

Consumer and industry adoption

The Government of Canada is working to promote consumer and industry adoption of clean technology through the development and release of 10 new and/or updated ENERGY STAR[®] technical specifications, and adding electric vehicle chargers and smart thermostats to the program for the first time. Regulations were amended in fall 2017, updating or introducing new standards for multiple product categories.

Ontario recently announced the Green Ontario Fund, a not-for-profit provincial agency that will deliver programs and rebates to help reduce energy costs in homes and businesses. The new Energy Efficiency Alberta established by the Alberta Government has launched a number of energy efficiency programs to generate energy savings across residential and commercial sectors. Québec is also investing in several programs that promote energy efficiency and GHG reductions across various sectors of the economy, including EcoPerformance and Programme d'aide Écocamionnage.

STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS

Enhance alignment between federal, provincial, and territorial actions

The federal government is launching an online Clean Growth Collaboration Community to support Canadian clean technology innovators by facilitating interactions with the federal, provincial and territorial programs and services. The Federal-Provincial-Territorial Working Group on Clean Growth developed a Pan-Canadian vision statement on clean technology and clean growth that commits to improved program and policy collaboration and coordination across jurisdictions and institutions.

Québec is reviewing its financial support programs for business and innovation to harmonize and simplify its programming and is working with Treasury Board of Canada Secretariat to identify avenues for collaboration in the review of federal innovation programs.

Establishing a clean technology data strategy

The federal government has allocated \$14.5 million to develop a clean technology data strategy and in 2017, consultations with PTs, industry and other stakeholders were conducted via a Federal-Provincial-Territorial Working Group. Québec and Ontario are working together with Statistics Canada and the Subcommittee on the Federal Clean Tech Data Strategy to identify issues related to the definition of the cleantech sector.

CROSS-CUTTING

Canada

The Government of Canada is advancing meaningful engagement with First Nations, Inuit, and the Métis Nation during the Pan-Canadian Framework's implementation, including through three distinctions-based bilateral tables. As such, the tables provide opportunities for ongoing engagement with Indigenous Peoples in the implementation of the Pan-Canadian Framework and on broader climate change priorities.

In April 2017, Natural Resources Canada launched a national dialogue, Generation

	<p>Energy, which invited Canadians to share their ideas and participate in building a vision for Canada's energy future through online participation, in-person panels and workshops. The feedback received will help to define Canada's energy future for the next generation, as Canada develops an energy policy direction to complement the work being done by the provinces and territories.</p> <p>In October 2017, in Winnipeg, Manitoba, national and international stakeholders gathered for the Generation Energy Forum to discuss how Canada is preparing for the reliable, affordable, low-carbon energy economy of the future.</p>
Alberta	<p>Alberta continues to make progress on the implementation its Climate Leadership Plan.⁴ The Climate Leadership Plan is a made-in-Alberta strategy to reduce carbon emissions while diversifying the economy, creating jobs and protecting the province's health and environment. The Plan was created to mitigate GHG emissions and to transition to a lower carbon economy.</p> <p>Alberta's Climate Leadership Plan includes a commitment to reinvest revenues from the carbon levy into Alberta's economy, including standing up of Energy Efficiency Alberta, a new public agency launched in 2017 that helps Albertans increase the energy efficiency of their homes, businesses, and communities.</p>
Ontario	<p>Ontario is implementing its Climate Change Action Plan.⁵ The plan outlines the key actions the government is taking to combat climate change, create good jobs in clean tech and construction, increase consumer choice, and generate opportunities for investment in Ontario. In August 2017, Ontario also launched the Green Ontario Fund, a non-profit provincial agency with planned funding of \$2.4 billion over the next 4 years funded through proceeds from the province's carbon market. The fund is tasked with reducing GHG pollution in buildings and industry to help meet Ontario's emission reduction targets.</p>
Manitoba	<p>Manitoba is establishing a new stand-alone Crown corporation—Efficiency Manitoba—to deliver energy efficiency programs and services in Manitoba.</p>
Prince Edward Island	<p>Prince Edward Island has developed a 10-year Energy Strategy to reduce energy use, establish cleaner and locally produced energy sources and moderate future energy price increases.⁶ The Strategy is guided by three principles: lowering GHG emissions, cost-effectiveness, and creating local economic opportunities and will be implemented over the next 10 years.</p> <p>Prince Edward Island is in the process of developing a new Climate Change Action Plan on Mitigation and Adaptation. This plan will include actions designed to reduce GHG emissions, enhance carbon sequestration, and adapt to a changing climate. The Climate Change Action Plan on Mitigation is expected to be released this fall and implemented over the coming years.</p>
New Brunswick	<p>New Brunswick is implementing its new comprehensive Climate Change Action Plan – Transitioning to a Low-Carbon Economy⁷, which commits the province to stronger action in both GHG emission reductions and in building resilience to the impacts of a</p>

⁴ <https://www.alberta.ca/climate-leadership-plan.aspx>

⁵ <https://www.ontario.ca/page/climate-change-action-plan>

⁶ http://www.peiec.ca/uploads/6/6/6/4/66648535/pei_energy_strategy_march2017_web.pdf

⁷ <http://www2.gnb.ca/content/gnb/en/departments/elg.html>

	changing climate.
<i>Nova Scotia</i>	Nova Scotia continues to build on the work outlined in its Climate Change Action Plan ⁸ by further reducing its GHG emissions and adapting to the changing environment.
<i>Newfoundland and Labrador</i>	Newfoundland and Labrador has committed to developing a new Climate Change Action Plan and has undertaken public consultations to inform next steps.
<i>Yukon</i>	Yukon is in the first stages of planning a new integrated strategy for energy, climate change and green economy in partnership with Yukon First Nations and municipalities. The plan is expected to be released in 2019.
<i>Northwest Territories</i>	Northwest Territories committed over \$2.7 million in 2017 to the Arctic Energy Alliance (AEA) to provide energy efficiency programs and services to residents, businesses, and communities.
<i>Québec</i>	<p>Québec is implementing its 2013-2020 Climate Change Action plan.⁹ The plan outlines the government's priorities and actions in the fight against climate change.</p> <p>Québec is also modernizing its Environment Quality Act. The new provisions of the act will take into consideration GHG emissions as well as reduction and adaptation measures for all new projects requiring an environmental assessment.¹⁰</p> <p>Québec created the Transition énergétique Québec (TEQ) in 2017 to support, stimulate, and promote the energy transition, innovation, and efficiency, and to coordinate the implementation of all the programs and actions necessary to achieve Québec's energy targets. Québec's Research and Innovation Strategy¹¹ will contribute to the development of economic solutions.</p>
<i>Atlantic Provinces</i>	The Atlantic Clean Energy Partnership was launched in 2017 to identify potential enhancements to electricity generation and transmission, to promote energy efficiency, and to support clean energy technologies.

⁸ <https://climatechange.novascotia.ca/sites/default/files/uploads/ccap.pdf>

⁹ http://www.mddelcc.gouv.qc.ca/changements/plan_action/pacc2020.pdf

¹⁰ <http://www.mddelcc.gouv.qc.ca/lqe/autorisations/fiches/changements-climatiques.pdf>

¹¹ <https://www.economie.gouv.qc.ca/objectifs/informer/recherche-et-innovation/strategie-Québécoise-de-la-recherche-et-de-l'innovation/>

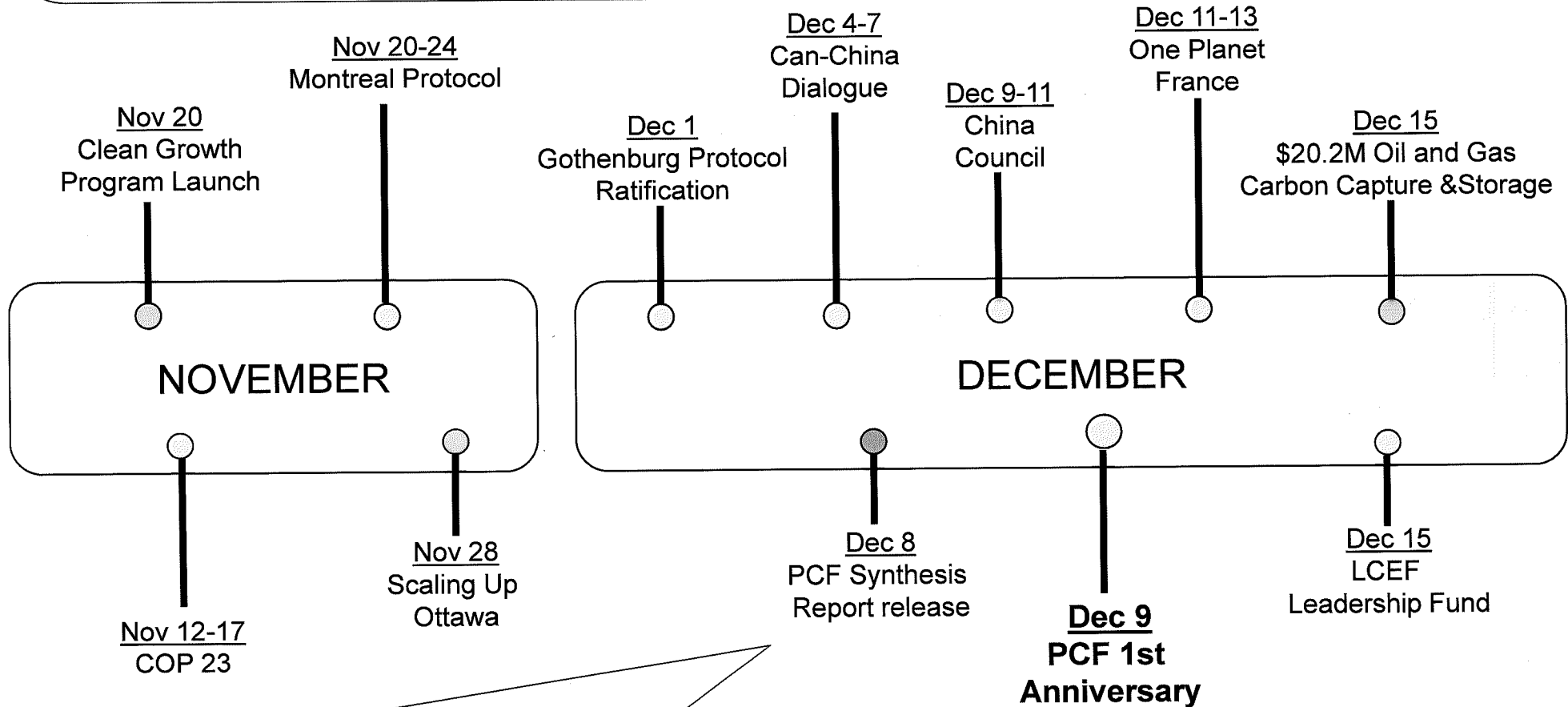
Clean Growth and Climate Change Communications Strategy Up to FMM and Beyond

ECCC

NRCan

PCO

To increase Canadians awareness and perception that the GOC is working collaboratively and effectively through the PCF across jurisdictions to address climate change and grow a clean economy.



Collaborative FPT communications approach
Joint announcement
Synthesis report posted on Clean Growth and Climate change website @ Canada.ca
FPT Co-signed report memo and *communiqué*

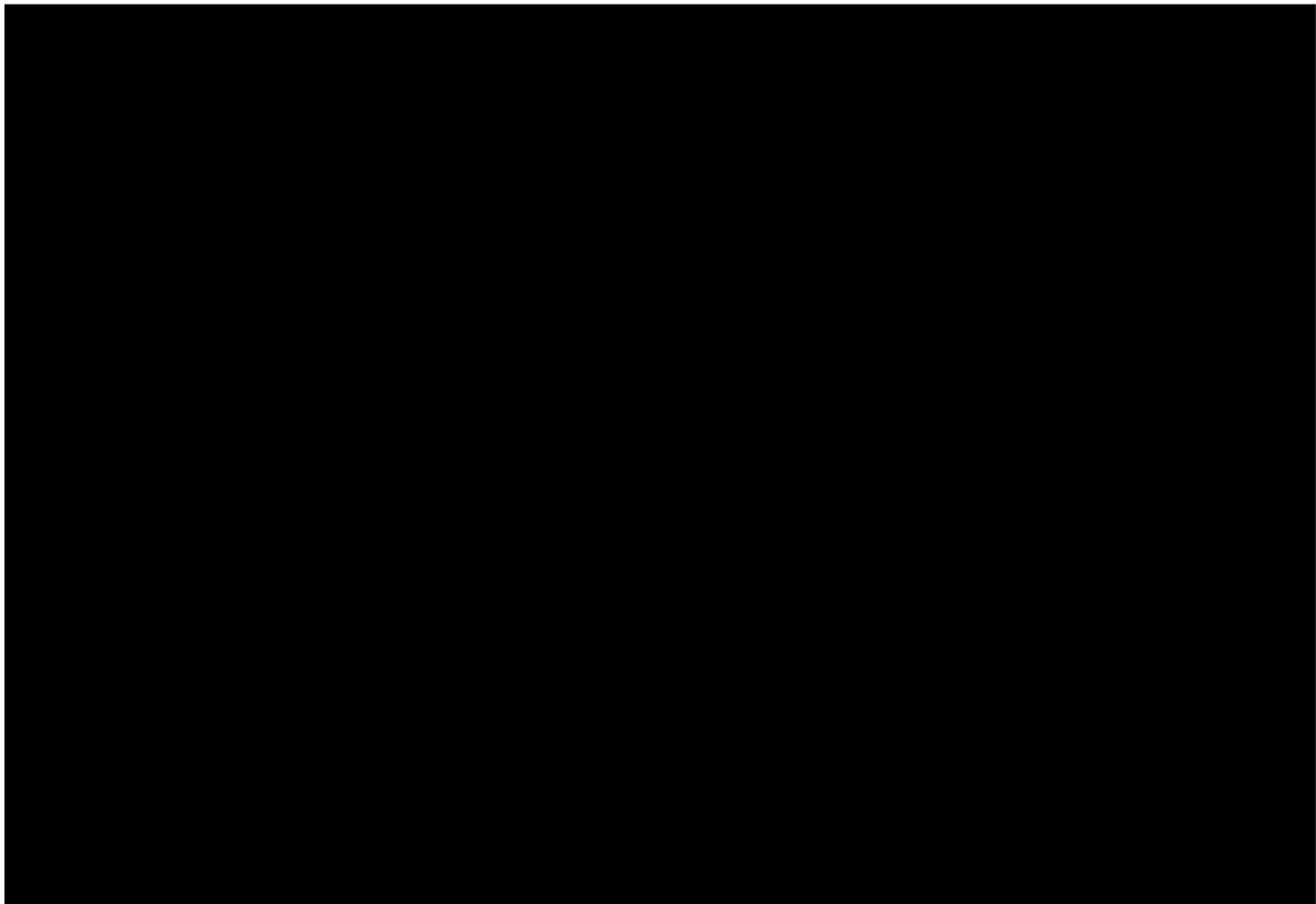
Announcements

Events

Social Media

Marketing

Media



DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

Adaptation and Climate Resilience Pillar - update and strategic directions

Item to be Presented by: Matt Parry, DG Strategic Policy Directorate, Environment and Climate Change Canada - TBC

Objective

- For information. To provide an overview of federal activities under the adaptation and climate resilience pillar of the PCF.

Context/Current Status

- This item will be a context-setting presentation to provide an overview of the breadth of the adaptation challenge and federal response and to set the stage for subsequent conversations
- This item provides information on new and enhanced federal adaptation programs that were approved in September 2017 and will be launched in the coming months
- The following departments are implicated in work on adaptation and climate resilience: Environment and Climate Change Canada, Natural Resources Canada, Indigenous and Northern Affairs Canada, Transport Canada, Fisheries and Oceans Canada, Infrastructure Canada, National Research Council, Standards Council of Canada, Health Canada, Public Health Agency of Canada, Canadian Institutes of Health Research, Parks Canada, Agriculture and Agri-Food Canada, Public Safety Canada, Treasury Board of Canada Secretariat

Considerations/Risks

- Given the horizontal nature of adaptation and climate resilience and the broad range of stakeholders, there is a need to move forward with a strategic and coherent federal response
- This overview presentation is the result of significant interdepartmental collaboration, and departments are committed to continuing to work together to implement action

Next Steps / Key Decision Points

- Departments will continue to work together to better align programming and coordinate outreach and communications
- Future presentations will support discussion on detailed program roll out and strategic alignment of activities

Supporting Documents

- Powerpoint Presentation: Adaptation and Climate Resilience
- Visual Adaptation Frame and Activity Map



Government
of Canada

Gouvernement
du Canada



Adaptation and Climate Resilience

PCF DM Committee
November 2017

Canada

Objective

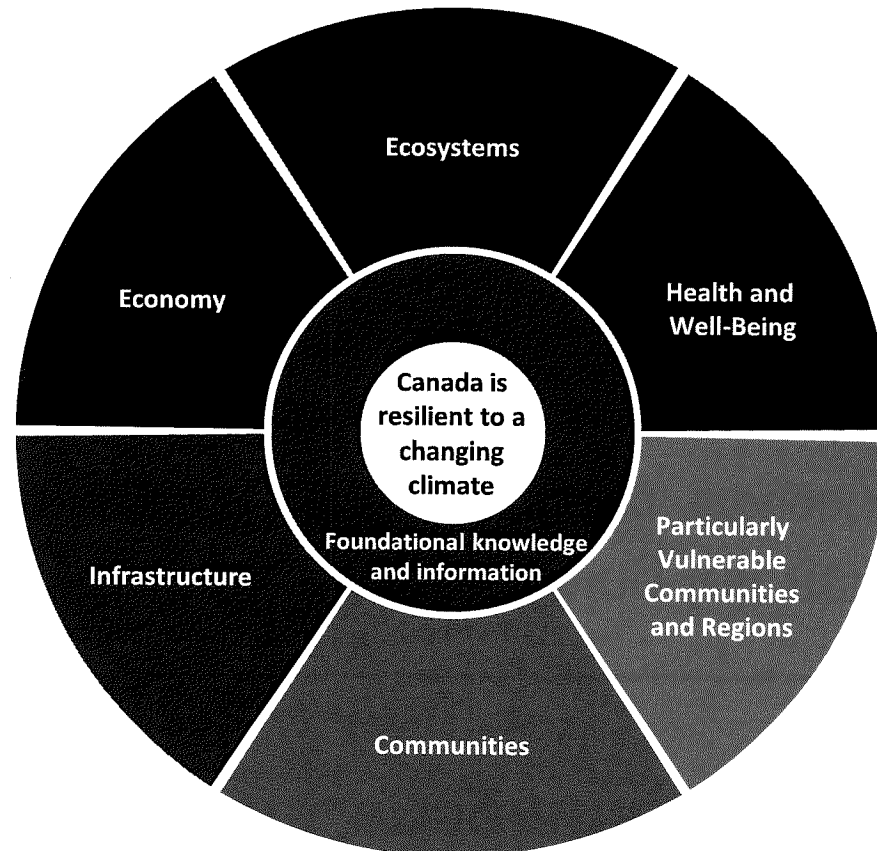
- Provide an overview of adaptation to set the context for future targeted discussions on progress of federal adaptation and climate resilience initiatives (*e.g. the Northern Adaptation Strategy, which follows immediately*)
- Outline horizontal adaptation priorities
 - Implementing PCF adaptation programs
 - Building resilience in federal operations
 - Expanding communications and outreach activities
 - Strengthening partnerships outside government

Adaptation can protect Canadians and build resilience to climate change

- Climate change impacts already being felt across the country
 - Changes in extremes (heat waves, flooding, drought)
 - Introduction of new pests and diseases
 - Infrastructure and transportation network disruptions
 - Changes in water availability
- Urgent, sustained, and ambitious action will help protect Canadians, minimize damages, lower costs, and take advantage of opportunities
- Scope of the challenge extends beyond any single region, government, or sector

Adaptation is a shared challenge, implicating all aspects of society and the natural environment

- Considering climate resilience through different perspectives shows the breadth of the challenge; mapping activities can demonstrate the federal government response



Opportunity to mobilize Canadians to scale up adaptation action

- Governments, communities and the private sector are taking some adaptation action and have indicated a need for more support
- Increasing awareness of the scale of climate-related impacts is creating demand for increased adaptation action
- PCF process called for strong leadership on adaptation by governments and significant and sustained action to address the magnitude of the challenge
- Improving linkages between pillars of the PCF may present new opportunities

Current priority is to deliver on the FPT adaptation commitments articulated in the PCF

- Implementing targeted federal adaptation programs under the PCF
 - Continued roll out of programs renewed in Budget 2016 (\$169.5M over 5 years)
 - New and expanded initiatives to be launched over the coming months (\$2.44B over 11 years) (See Annex)
- Strong coordination across the federal government
 - 16+ federal departments and agencies
 - Director and Director General-level governance

Leveraging other priorities can advance a whole-of-government approach to adaptation

- Other federal priorities play an important role in meeting adaptation and climate resilience objectives
 - Investing in Canada Plan
 - Emergency Management Strategy
 - Greening government
 - Integrated approach to biodiversity conservation
 - Arctic Policy Framework

Leading by example through resilient federal operations

- Building federal institutional resilience is part of response to the CESD audit, sustainable development objectives, and greening government commitments
- Developing a strategy on greening government, including resilient federal operations
- Opportunity to share best practices across departments and demonstrate leadership

Enhancing communications and outreach

- Mobilizing action on adaptation requires increased awareness
- Raising the profile of adaptation under the broader communications and outreach approach for clean growth and climate change
 - Adaptation communications strategy
 - Common key messages
 - Reinvigorated web presence
 - Announcement calendar
- Coordinating website and social media rollout with OGDs

Strengthening linkages with partners

- Adaptation is a shared challenge, requiring coordinated action
- Ongoing and emerging action to enhance collaboration
 - FPT Tables and engagement processes
 - Senior-level Indigenous engagement tables on PCF and broader climate change priorities
 - Canada's Climate Change Adaptation Platform
 - Potential adaptation Network of Centres of Excellence

Path forward

- Address PCF adaptation and climate resilience objectives with a strategic and coordinated federal response
 - Increase alignment as programs are implemented (e.g. leverage the DG- and Director-level governance structure)
 - Coordinated and enhanced communications, outreach, and engagement
- Ensure complementary federal priorities consider impacts of climate change and contribute to climate resilience outcomes
- Demonstrate federal leadership by advancing federal institutional resilience
- Mobilize action beyond governments

ANNEX – New/Expanded PCF Adaptation Programs (Budget 2017)

PCF Theme	Program Name
Translating information into action	Canadian Centre for Climate Services
	Building Regional Adaptation Capacity and Expertise Program
	Indigenous Community-Based Climate Monitoring
Building climate resilience through infrastructure	Transportation Adaptation and Resilience initiatives
Protecting and improving human health	Climate Change and Health Adaptation: Information and Action for Resilience
	Climate Change and Health Adaptation Program for First Nations and Inuit
	Infectious Diseases and Climate Change Program
	Climate Change and Health Research Initiative

ANNEX – New/Expanded PCF Adaptation Programs (Budget 2017) (2)

PCF Theme	New/Expanded Program
Supporting particularly vulnerable regions	<p>Aquatic Climate Change Adaptation Services Program</p> <p>Climate Change Preparedness in the North – Implementation of Adaptation Actions in the North Program</p>
Reducing climate-related hazards and disaster risks	First Nation Adapt – Floodplain Mapping Program

- Related initiatives will also be developed and implemented over the coming year, including infrastructure Integrated Bilateral Agreements and the Disaster Mitigation and Adaptation Fund

DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE PAN- CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

Northern Adaptation Strategy

Item to be Presented by:

- Jean- François Tremblay - TBC

Objective

- To provide an information update on the status of the Northern Adaptation Strategy.

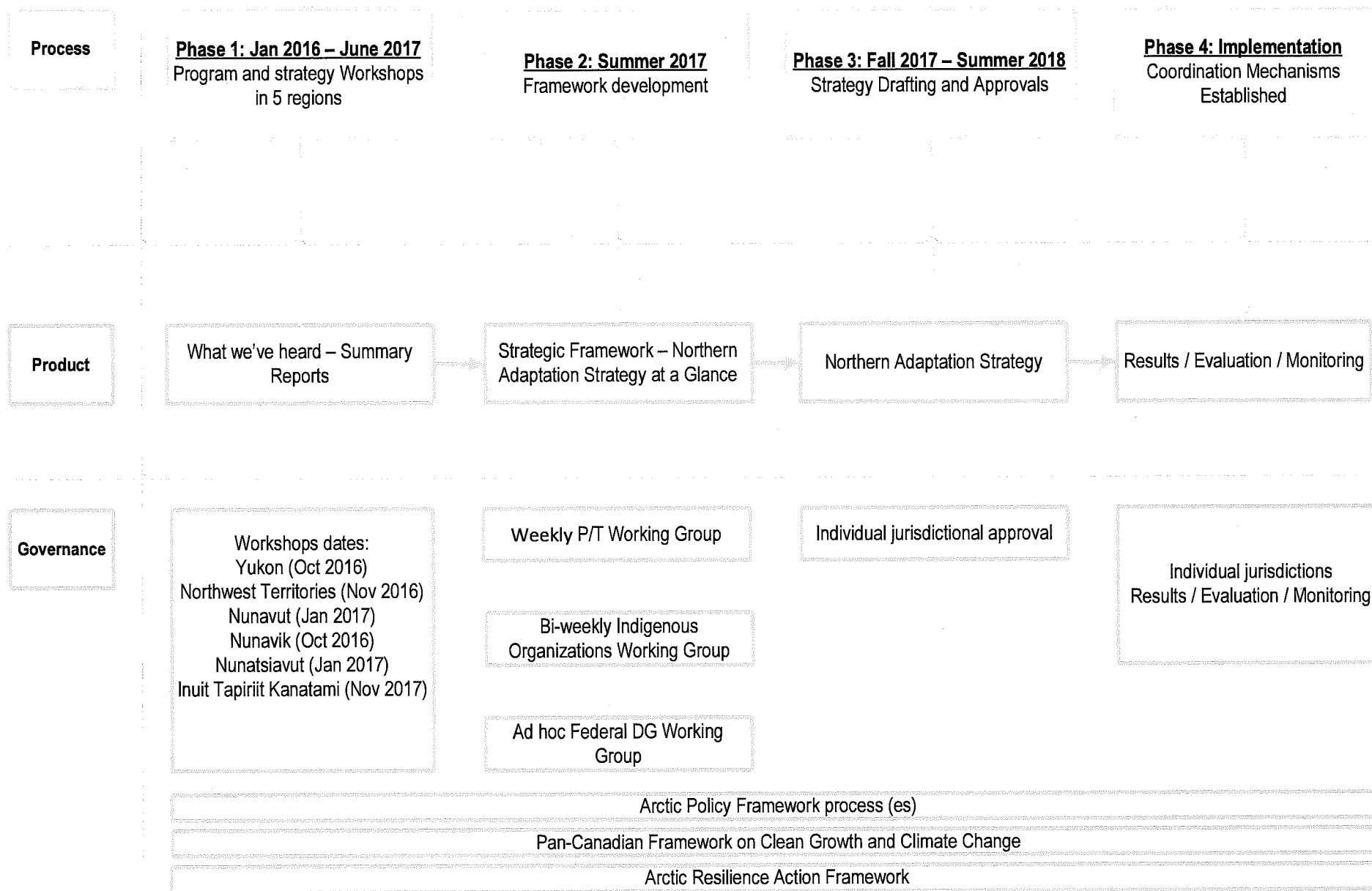
Context/Current Status

- The Northern Adaptation Strategy is a key deliverable under the adaptation and climate resilience pillar of the Pan-Canadian Framework on Clean Growth and Climate Change.
- The need for an Adaptation Strategy was also highlighted in the Minister's Special Representative for the new Shared Arctic Leadership Model "*...an adaptation strategy and an implementation plan for the Arctic must become a national priority within Canada's climate change commitments*".
- The importance of the information received during her engagement process was reinforced in December 2016, when the Prime Minister committed to co-developing a new Arctic Policy Framework, with Northerners, territorial and provincial governments, and First Nations, Inuit, and Métis people.
- As a first phase to the development of a Northern Adaptation Strategy and over the course of 2016-2017, workshops were organized in communities across the North, in Yukon, the Northwest Territories, Nunavut, Nunavik and Nunatsiavut. These workshops helped identify concrete actions and provide guidance to the federal, provincial, territorial, regional and local governments on climate change adaptation efforts.
- General agreement has been reached on the framework for the Northern Adaptation Strategy (see supporting document). This will form the basis of the Strategy itself.
- Indigenous and Northern Affairs Canada has established a collaborative process for the drafting phase of the Northern Adaptation Strategy which involves forty partners all at various levels of capacity. Additional engagement sessions are being organized with the research community, emergency and health care service providers as well as with municipalities and communities.
- The engagement approach includes weekly calls with provinces and territories, bi-weekly calls with Indigenous organizations, regional visits, webinars and a workshop in the spring to finalize the drafting process.
- The Northern Adaptation Strategy will apply to the territorial North as well as in northern Quebec (Nunavik) and Labrador (Nunatsiavut) to include all Inuit regions.

Considerations/Risks

- The collaborative drafting phase has proven to be challenging. The tools in place have not encouraged broad engagement and a number of our partners have stated that face-to-face meetings would be ideal for the drafting phase.
- Provinces and territories have indicated they would like to be signatories to the Northern Adaptation Strategy.

Northern Adaptation Strategy Development



Proposed Northern Adaptation Strategy at a Glance

Purpose of Strategy		
To establish partnerships and collaboration mechanisms to guide actions and investments across the territorial north and Inuit Nunangat and to articulate impacts of climate change on the north		
Outcome		
Strengthening cultural, social and economic capacity in Indigenous and northern communities to respond to the ongoing impacts of climate change		
Guiding Principles		
<div> <div>1. Create opportunities for collaboration across regions, jurisdictions and sectors</div> <div>2. Translate scientific and Indigenous knowledge into capacity and into action</div> <div>3. Enable capacity building and training in all related adaptation activities</div> </div> <div> <div>4. Recognize cultural and community strength as the cornerstone of resilience</div> <div>5. Address climate change in the context of multiple stressors</div> <div>6. Enable innovation in all areas of work</div> </div>		
Priorities and Action Areas		
Priority 1: Observe and understand impacts	Priority 2: Plan to reduce risks	Priority 3: Act to create resilience
<p>Climate change has already had a range of impacts including on: species of interest, water levels & cycles, soil, coasts and ice, permafrost thaw, which will continue. Immediate and ongoing action is needed to:</p> <p>1.1 Community Based Monitoring: Support Indigenous and northern communities in developing climate impact monitoring programs and research to inform climate change adaptation actions</p> <p>1.2 Conservation, biodiversity and ecosystems: Expand the network of monitoring stations where possible, leveraging existing and partnered infrastructure while increasing coordination</p> <p>1.3 Indigenous Knowledge and science integration: Connect Indigenous knowledge with science to build a better understanding of climate change and guide adaptation measures</p> <p>1.4 Science Plan: Align science to support decisions and adaptation actions through comprehensive planning</p> <p>1.5 Knowledge translation: Share and translate knowledge and information for communities and governments in a format that is useable and useful</p>	<p>These impacts present a range of risks to human health, food and water supply, residential and transportation infrastructure and safety:</p> <p>2.1 Vulnerability and hazard mapping: Undertake vulnerability assessments to identify risks to communities, including specific assessments of risks to infrastructure</p> <p>2.2 Emergency preparedness and search and rescue: Update emergency response plans and communicate back to communities as well as develop safety measures for people who travel on the land</p> <p>2.3 Adaptation planning: Take adaptation measures to help protect and improve infrastructure to help minimize disruption</p> <p>2.4 Collaboration: Foster collaboration and improve access to information, share lessons learned and success stories across communities</p>	<p>Capacity to adapt is founded on the ability of communities and regions to proactively identify and respond to impacts and risks from a basis of cultural strength, self-reliance and collaboration across scales:</p> <p>3.1 Capacity: Enhance local capacity to develop and implement adaptation actions at the individual, community and regional levels</p> <p>3.2 Mental health and well being: Address the linkages between climate change and mental and well-being</p> <p>3.3 Food and water security: Explore opportunities of an extended growing season for agriculture and greenhouses and to secure safe water supply</p> <p>3.4 Transportation: Invest in establishing safe and reliable transportation infrastructure</p> <p>3.5 Standards and codes: Support the development and implementation of building codes standards to reflect current and future changes in climate, and communicate to builders</p> <p>3.6 Innovation: Influence the expansion of innovative financial mechanisms to fund infrastructure and other investments</p>
Partnerships across jurisdictions		
<div> <div>Northern Adaptation Partnership</div> <div>Pan-Canadian Framework on Clean Growth and Climate Change</div> </div> <div> <div>Adaptation Platform</div> <div>Pan-territorial Adaptation Partnership</div> </div>		
Annexes		
Annexes will include government and regional specific strategies as they become ready		

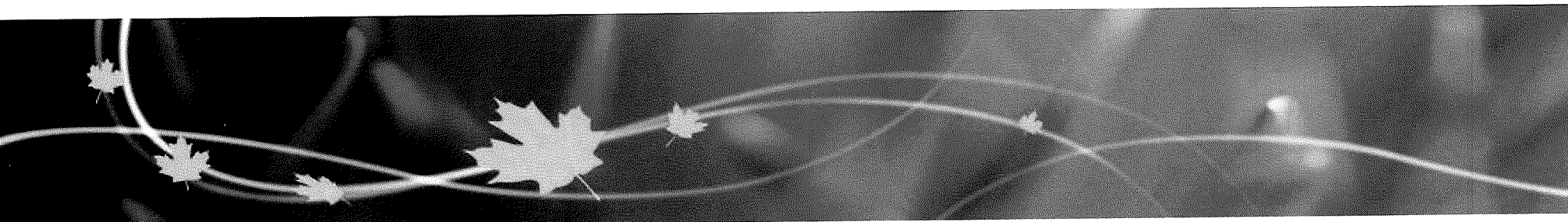
July 27, 2017



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada



Canadian Centre for Climate Services Progress Update

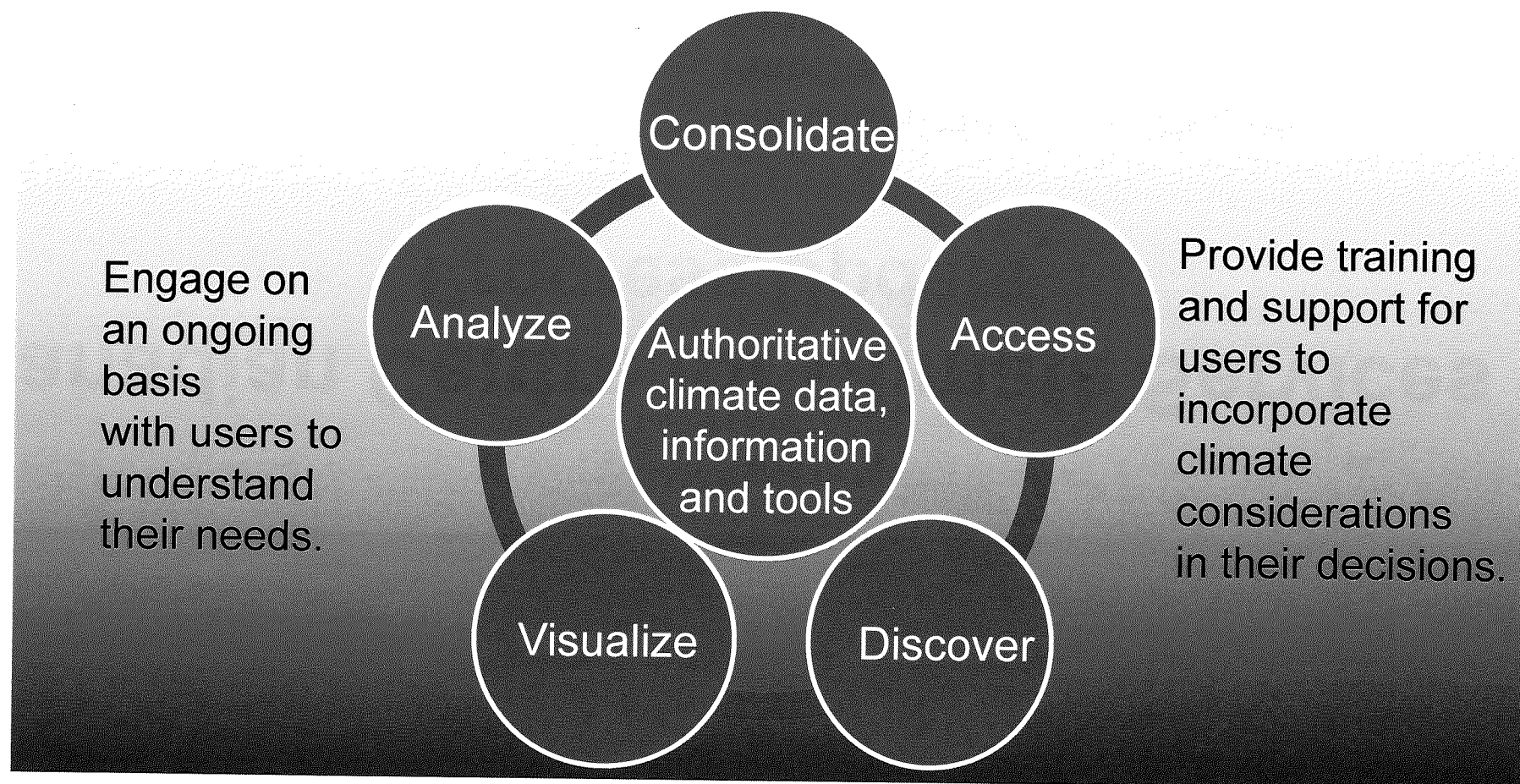
**DM Oversight Committee on
Pan-Canadian Framework
Implementation**

**Pan-Canadian Framework
Implementation Office**

November 29, 2017

Canadian Centre for Climate Services

In partnership with regional climate organizations, the Canadian Centre for Climate Services will:



Page 2 – November-27-17

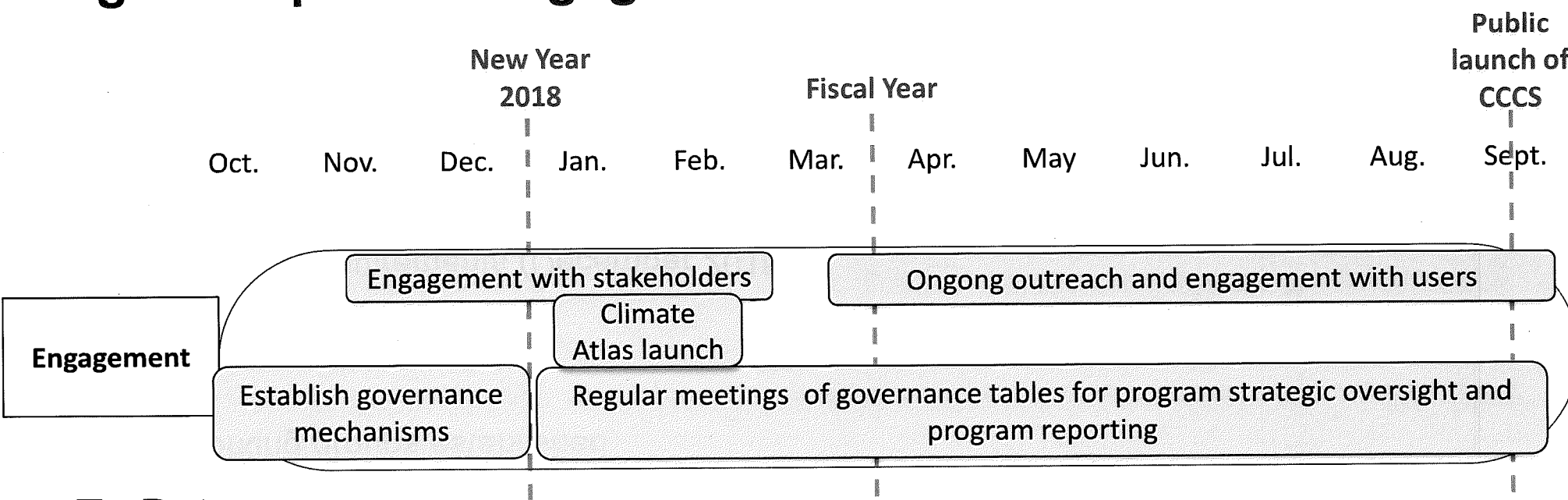


Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Progress Update - Engagement



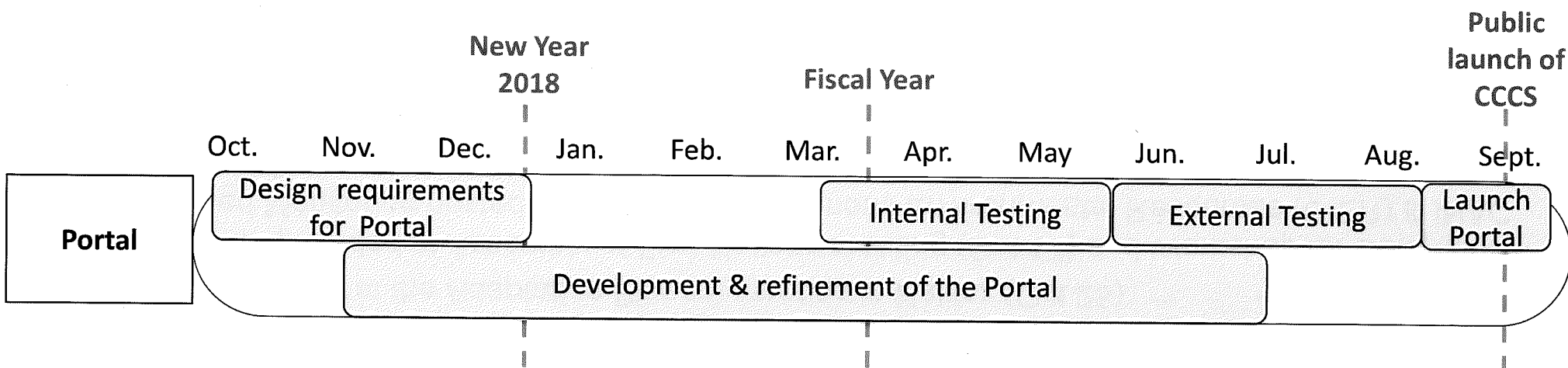
• To Date:

- Meeting with Health Portfolio Partners (Sept 13) and other government departments
- Bilateral conversations with all with all Provinces (partnered with NRCan) and Territories completed (Oct 4)
- Presentation at the Adaptation Plenary meeting in Halifax (Oct 25)
- Update provided at Assembly of First Nations meeting (Oct 17) and Workshop for Community-Based Monitoring hosted by Centre for Indigenous Environmental Resources (CIER) & INAC (Nov 8-9)

• Next Steps: Stakeholder engagement continuing through winter 2018

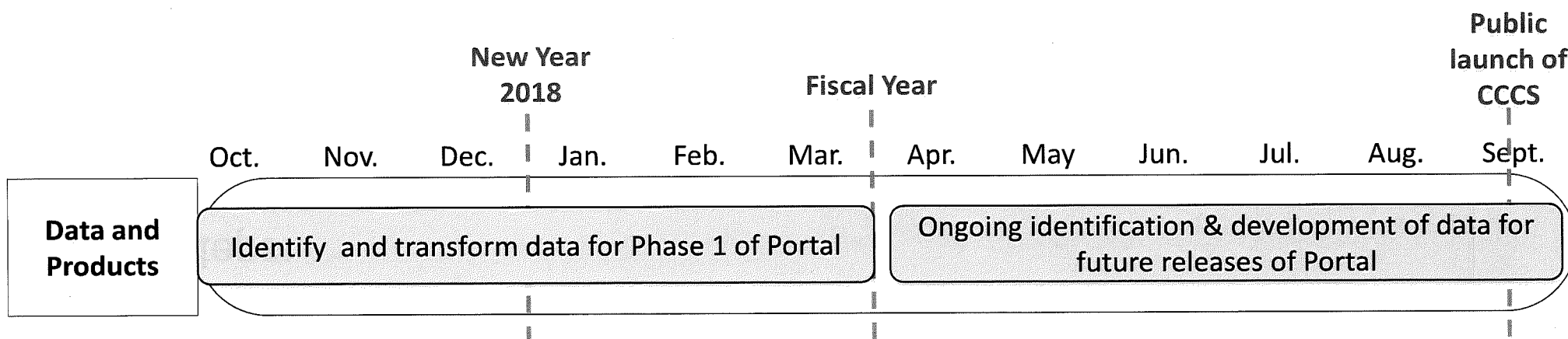
- Northern and Indigenous focus: Working with INAC (Northern Adaptation Strategy) and other PCFIO initiatives to align engagement approaches
- Climate Data Providers workshop (early Dec 2017)
- Climate Atlas: Prairie Climate Centre's Climate Atlas (PCC) launch (Feb 2018)

Progress Update – Portal



- To Date:
 - Design requirements and delivery options analysis underway
 - Working groups established
- Next Steps:
 - Finalize requirements (December 2018)
 - Development (through to June 2018)
 - Testing and refinement (March - Aug 2018)
 - Portal launch (September 2018)

Progress Update – Data and Products



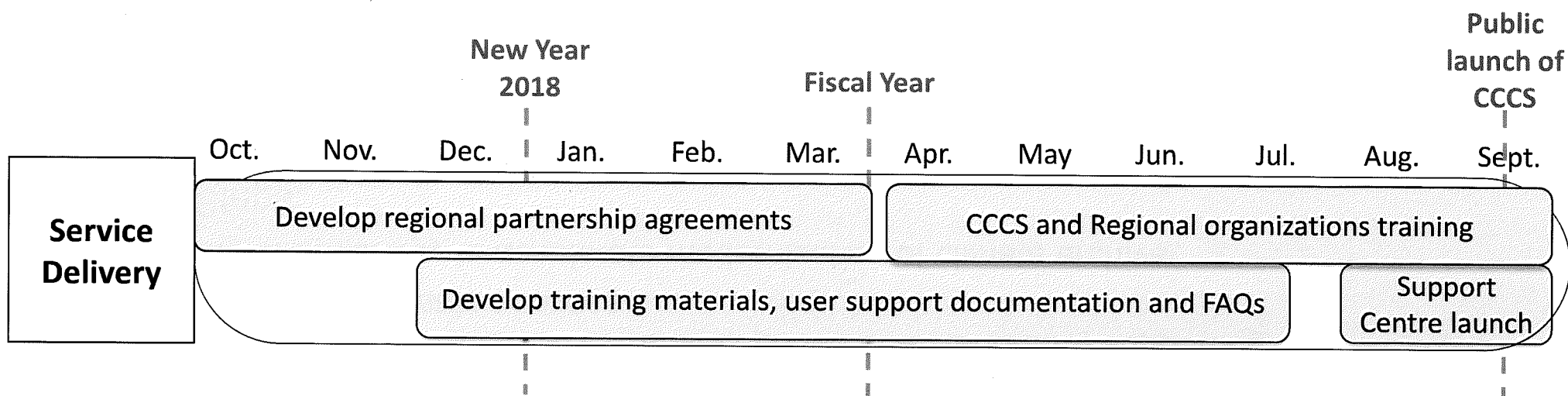
- **To Date:**

- Discussions ongoing to identify key data & products for phase I
- Initiated projects for targeted analyses & data products with other government departments and groups
- Expert science advice provided (by STB) at workshops and briefings (subjects: flooding and precipitation extremes; codes and standards) supporting the provision of climate services
- Efforts underway to accelerate modernization of climate archive

- **Next Steps:**

- Finalize and transform key data & products for phase I (March 2018)
- Continue to identify and undertake projects for targeted analyses & new data products (ongoing)
- Identify and develop data & products for future Portal releases (ongoing)

Progress Update – Service Delivery



- **To Date:**

- Existing organizations (Ouranos and PCIC) have approval to negotiate and enter into agreement with CCCS
- Working with provinces to foster the development of regional adaptation hubs
 - Atlantic Region within a year; Prairie Region interested but not committed to timeline yet; Territories not yet ready for active development

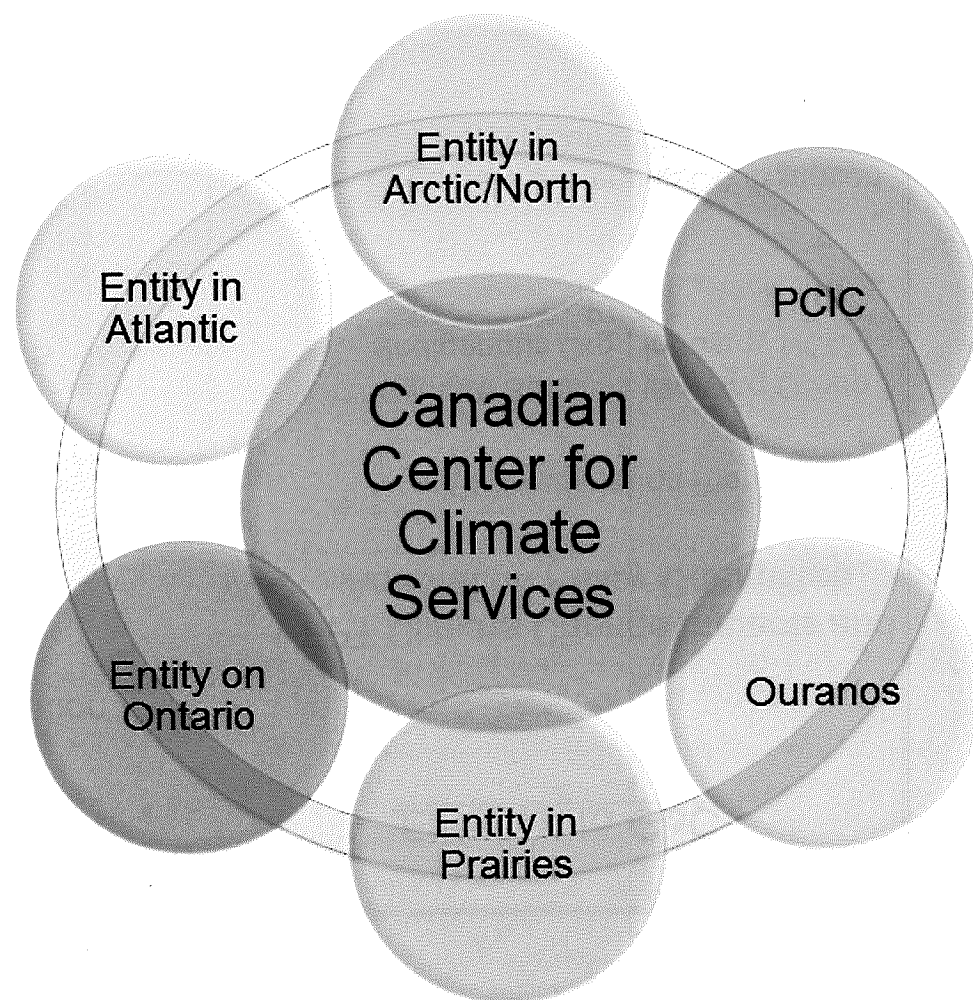
- **Next Steps:**

- Formalize regional partnerships (by March 2018)
- Foster the emergence of regional adaptation hubs with Atlantic and Prairie provinces
- Develop training materials and support mechanisms
- Launch national support (September 2018)

Partnership with Regional Organizations

- Partner with other organizations who can help shape and deliver services:

- Existing: PCIC, Ouranos, Ontario Ministry of Environment and Climate Change
- Emerging: Atlantic Region; Prairie Region; Northern/Territories
- Climate Atlas: support for the Prairie Climate Centre's Climate Atlas (PCC) will help inform best practices for user engagement / uptake



Page 7 – November-27-17



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Governance

Internal to GoC

DM Oversight Committee on PCF Implementation
ADM Committee on PCF Implementation

DG Adaptation & Resilience Committee

Adaptation and Resilience Task Team (DARTT)

Canadian Centre for Climate Services

ECCC Oversight

- Senior Management & DM Task Force
- Directors for Climate Services (bi-weekly)
- CCCS Management Committee (weekly)

External to GoC

FPT Climate Change Impacts and
Adaptation Policy Committee

FPT Adaptation Plenary

Climate Services Working Group
(Indigenous Org., industry, NGO ,
FPT)

Regional Partnership Coordination
Committee

Reporting

Advice & Influence

Page 8 – November-27-17

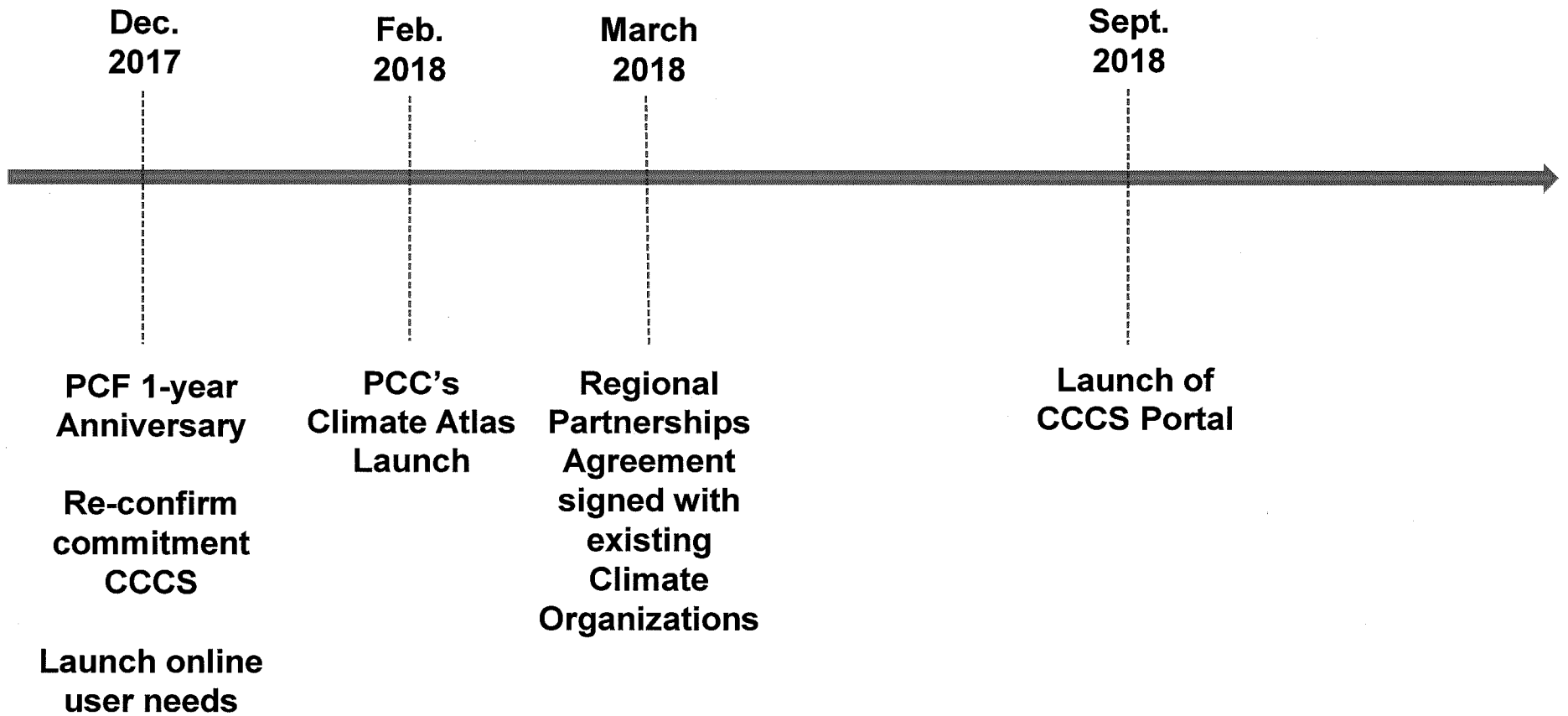


Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Proposed Announcements



Page 9 – November-27-17



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Annex A

Roles and Responsibilities – ECCC Branches

Branch/Division	Resources	Role/Responsibility
Science & Technology Branch Climate Research Division	<p>Existing + up to <u>9 FTEs</u> (reallocated from existing Branch resources)</p> <p><i>In place: 4 FTEs</i> <i>In progress: 2 FTEs</i> <i>Planned: TBD</i></p>	<p>Provides climate data and scenarios to sophisticated users via the Canadian Climate Data and Scenarios (CCDS) website. Works closely with CCCS to address needs of basic and intermediate users, developing documentation and training.</p> <ul style="list-style-type: none"> • Provide research, climate models and data analysis methods for climate services data & scenario products, as well as the historical climate data and climate scenario tailored products development and documentation. • Provide science advice for design of climate portal and production of CCCS data/products (e.g. user guides) • Validate federal and external data/products and development of new products. • Contribute scientific expertise for engagement / communication activities, training and User Support Centre. • Co-develop with OGDs targeted sector and regional analyses and data products.



Annex A

Roles and Responsibilities – ECCC Branches

Branch/Division	Resources	Role/Responsibility
Pan-Canadian Framework Implementation Office Canadian Centre for Climate Services	16.5 FTEs plus 5 FTEs to be allocated to other groups as priorities determine (year 2 onward) <i>In place:</i> 9.5 FTEs <i>In progress:</i> 4 FTEs <i>Planned:</i> 3 FTEs	<ul style="list-style-type: none"> Overall direction-setting, program design & delivery, and reporting to Senior Management Lead negotiations with partners, dialogue with stakeholders, for co-delivery of services Coordinate and ensure consistency, accessibility and ongoing improvement in the development and delivery of data and products Establishment & maintenance of a climate Information portal and User Support Centre
Strategic Policy Branch Strategic Policy Directorate	2 FTEs <i>In place:</i> 1 FTE <i>In progress:</i> 1 FTE	<ul style="list-style-type: none"> Contribute content for climate portal on climate adaptation in line with adaptation communications strategy Coordinate with CCCS as part of broader Adaptations programming across ECCC and GoC.

Page 11 – November-27-17



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Roles and Responsibilities – ECCC Branches

Branch/Division	Resources	Role/Responsibility
Meteorological Service of Canada	Existing + 9 new FTEs <i>In place:</i> 6 FTEs <i>In progress:</i> 1 FTEs <i>Planned:</i> 2 FTEs	Continues to deliver foundational science on weather, environmental observation and numerical prediction to inform CCCS implementation and leads the climate archive renewal. <ul style="list-style-type: none">• Lead in the complete accelerated modernization of the Archives by the end of Y5, with incremental releases.• Facilitate the incorporation of external data into the archive• Update intensity, duration, frequency precipitation stats• Provide science advice and technical support for design of climate portal, production of CCCS data/products and access of the Climate Archive• Contribute MSC expertise (where possible) to coordinated production of CCCS products, including with other federal departments and regional consortia.
Corporate Services and Finance Branch	Existing + 11 new FTEs <i>In place:</i> 6.5 FTEs <i>In progress:</i> 2 FTEs <i>Planned:</i> 3.5 FTEs	<ul style="list-style-type: none">• Lead the elicitation, analysis and documentation of IM/IT requirements for the CCCS.• Lead portal design, development & delivery in conjunction with partners and professional services• Responsible for project management and ensuring TBS requirements are met• Lead the technical architecture transformation of the climate archive modernization, in partnership with the MSC• Provide the IM/IT leadership and engineering needed to develop and make accessible ECCC data and products• Provide recommendations on appropriate QA/QC standards for accepting external datasets• Provide recommendations on appropriate standards for external climate related data sets• Assist in the digitization of Historical Climate Records

DEPUTY MINISTER OVERSIGHT COMMITTEE ON THE PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

LCEF Funding Decisions

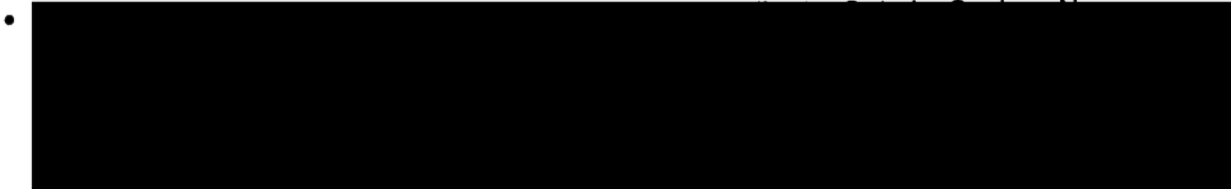
Presented by Serge Bijimine, Executive Director, LCEF Secretariat, ECCC

Objective

- For information

Current Status

- At the November 15 meeting of the LCEF ADM Governance Committee funding recommendations were approved for referral to the Minister of Environment and Climate Change.
- The LCEF ADM Governance Committee includes participants from: CHMC, FIN, INAC, INFC, ISED, NRCan and TBS.



Considerations

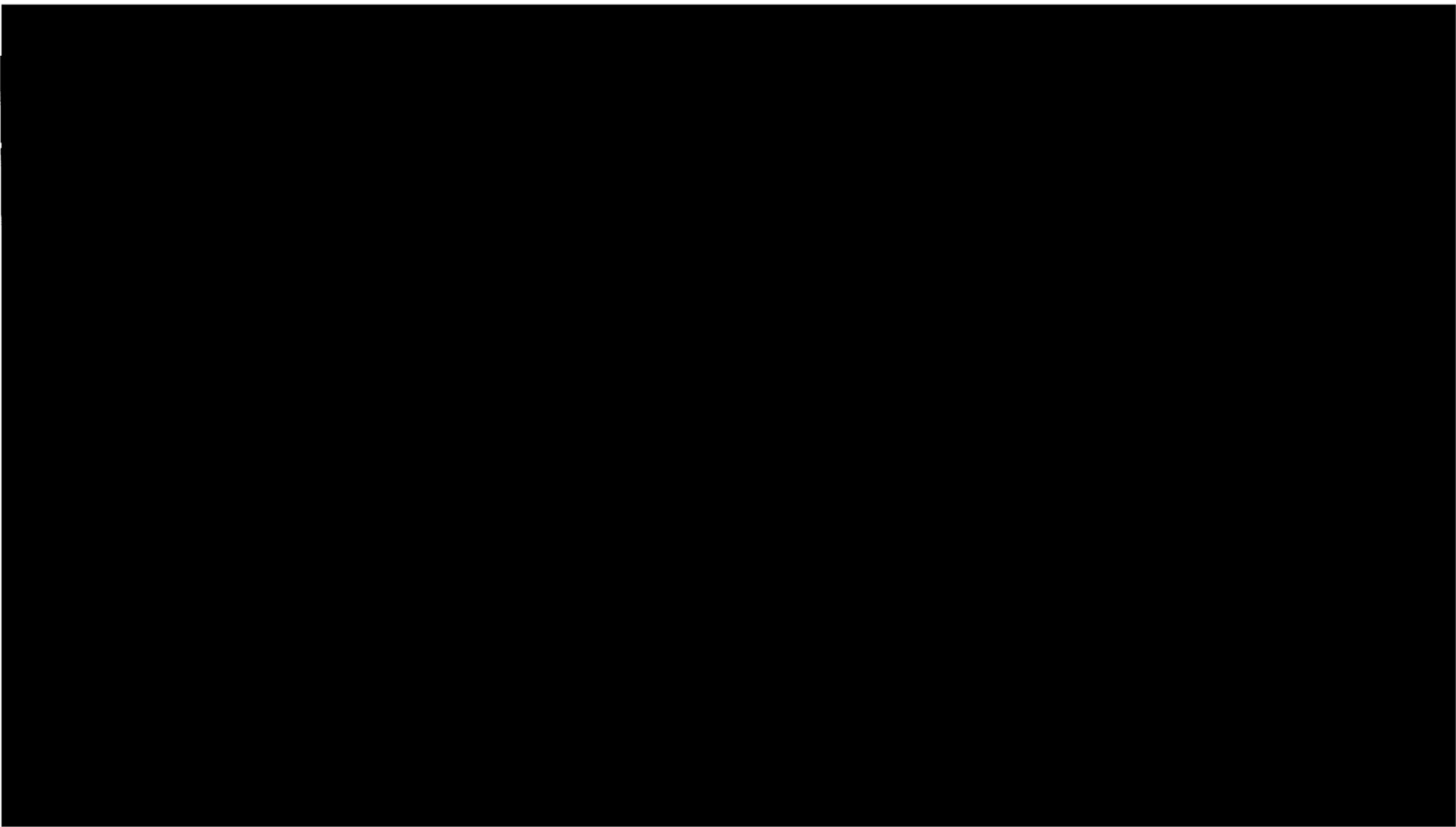
- Proposals from remaining jurisdictions [redacted] as well as additional proposals from [redacted] will be considered at future LCEF ADM Governance Committee meetings.

Next Steps

- [redacted]
- High-level announcements with provinces and territories or other communications activities are planned tentatively for mid-December 2017.

Supporting Documents

- LCEF Leadership Fund Status Placemat



Targeted Federal Climate Change Science Plan

DRAFT

Table of Contents

Executive Summary.....	2
A. Context	3
B. Purpose and Objectives.....	3
C. Identifying Priorities	4
D. Priority Action Plans for Climate Change Science	6
E. Implementation	10
Annexes	13
Annex 1 –Communicating and Delivering Climate Change Science Knowledge Action Plan.....	13
Annex 2 –Carbon Cycle and Sinks Action Plan	19
Annex 3 – Water Action Plan	27
Annex 4 –Resilient Regions and Communities Action Plan	38
Annex 5 –Human Dimension of Climate Change Action Plan.....	45
Annex 6 – Examples of Climate Change Initiatives Funded Under Budgets 2016 and 2017	52
Annex 7 – 2016 Inventory of Federal Climate Change Science Activities by PCF Actions Area	53
Annex 8 – Research Grants and Funding for Post-Secondary Institutions.....	55
Annex 9 – Science Needs in PCF Working Group Papers.....	56
Annex 10 – Selected Governance Mechanisms for the Pan-Canadian Framework on Clean Growth and Climate Change and Federal Climate Change Science Activities.....	58
Annex 11 – Federal Clean Growth and Climate Change Governance.....	59

Executive Summary

With the Pan-Canadian Framework on Clean Growth and Climate Change (PCF), Canada has set an ambitious agenda to guide actions that will grow the economy while reducing emissions, protect and enhance carbon sinks, and build resilience to adapt to a changing climate. Science-based information underlies the effective delivery of climate change actions and the PCF provides a strong driver for a more holistic planning and delivery of climate change science for Canada.

Federal departments and agencies have core, mandated responsibilities and priorities that support the delivery of the PCF. The Federal Targeted Climate Change Science Plan (the Plan) is not meant to reflect all of these; rather its objective is to strategically accelerate the delivery of the science needed to inform climate change actions by focusing on specific areas that would benefit from multi-department and agency collaboration, increased external engagement and the adoption of innovative practices. The Plan brings together federal departments and agencies that perform climate change science as well as key additional federal stakeholders. In particular, collaboration with the federal granting councils will support the alignment of internal and external science capacities in the pursuit of shared outcomes. This is in line with the Government's efforts, championed by the Minister of Science, to build a more interconnected federal science enterprise supporting evidence-based decision-making.

The Plan identifies five (5) priority themes with corresponding action plans setting out the activities that will be undertaken and the details of their implementation. PCF governance structures will provide overarching strategic direction and implementation oversight for the Plan in order to ensure a strong connection to policy decisions while measuring and reporting on progress.

A. Context

As a signatory to the Paris Agreement, Canada is committed to limiting global average temperature rise to well below 2 °C above pre-industrial levels, and to pursue efforts to limit the increase to 1.5 °C to reduce the risks and impacts of climate change. In support of these commitments, federal, provincial and territorial First Ministers developed the Pan-Canadian Framework on Clean Growth and Climate Change (PCF)¹ to guide actions that will grow the economy while reducing emissions, protect and enhance carbon sinks, and build resilience to adapt to a changing climate.

Vision - What Success Will Look Like
Purpose-driven and relevant science contributes to addressing climate change, a critical societal challenge of global importance. Relevant actors, both inside and outside government, collaborate to identify areas of focus and deliver expected results. Better coordinated and aligned internal and external capacities provide the best available science to support decision-making and actions for climate change. This Federal Targeted Climate Change Science Plan (the Plan) describes how we will get there.

Science-based information underlies the effective delivery of the PCF. There is substantial capacity to generate this information; Canada being home to a broad climate change science community with internationally recognized expertise. However, there is currently no common “platform” to identify priorities in a coordinated way, facilitate collaboration, leverage expertise and demonstrate success. There needs to be greater coordination, integration and collaboration of all actors, inside and outside Government, to achieve results and maximize outcomes of climate change science in Canada. The PCF is a strong driver for the development of a more systemic organization of climate change science, ensuring that the full capacity is leveraged to support its delivery.

B. Purpose and Objectives

There is a broad range of climate change science producers and users in Canada, with a significant proportion of the science federally funded or federally performed. This Plan is intended for the federal community, with the objective of strategically accelerating the delivery of the science needed to inform climate change actions by focusing on specific areas that would benefit from horizontal collaboration, engagement and the adoption of innovative practices. The Plan focuses on advancing scientific research and science-based solutions, as well as improving how scientific knowledge is communicated to different audiences. Throughout the Plan’s development, the federal granting agencies are engaged throughout to support the alignment of intramural and extramural science capacity. The Plan will be updated periodically to reflect progress and the identification of new priorities.

¹ Pan Canadian Framework on Clean Growth and Climate Change

The activities that will be undertaken as part of this Plan are set out in a series of action plans (Annexes 1 to 5), which are organized around priority themes. The action plans describe the activities, what they are intended to achieve and how they will inform climate change actions and policies. They also identify, for each activity, leadership and collaborations, deliverables with milestones, resources and proposed governance.

Governance mechanisms will facilitate science-policy linkages, support collaboration within the activity, ensure appropriate alignment of resources, inform on progress, and identify emerging priorities. Existing PCF senior management governance committees will provide overarching strategic direction and implementation oversight for the Plan.

While the intended audience for the Plan is the Government of Canada, it will be shared openly with Canadians to:

- hear from users and partners on climate change science about their needs and priorities;
- engage the broader climate change science community; and
- engage Indigenous Peoples and their knowledge holders about the co-application of Indigenous Knowledge and climate change science to inform policy actions.

C. Identifying Priorities

Acknowledging Existing Climate Change Science Related Activities

The targeted priorities identified in this Plan are not meant to supersede or replace priorities already guiding the work of federal departments and agencies. Federal departments and agencies have legislated responsibilities and priorities established through Cabinet and Ministerial mandates that support the delivery of the PCF. The activities found in each action plan are either new, building upon or amplifying existing work.

Budgets 2016 and 2017 funded various climate change initiatives (Annex 6), a number of which have strong science components. In addition to investments in infrastructure and clean technology innovation activities in support of emissions reductions, the government is investing in a new Canadian Centre for Climate Services that will provide Canadians with

Scope

In this Plan, climate change science is defined broadly as scientific research and related activities, inclusive of the natural and social sciences.

The focus is on harnessing science, Indigenous and local knowledge for the mitigation, adaptation and climate resilience objectives of the PCF. The Plan complements federal clean technology and carbon pricing initiatives, which are coordinated under other fora. Scientific research related to technologies whose primary purpose is to support climate resilience (e.g., climate resilient infrastructure), falls within the scope of this Plan.*

**Clean technology can be considered as any product, process or service designed with the primary purpose of contributing to remediating or preventing any type of environmental damage, or product, process or service that is less polluting or more resource-efficient than equivalent normal products that provide a similar utility.*

authoritative climate science and information to support climate adaptation decision making. The government will also establish a new Indigenous Guardians program for community-based climate change monitoring. Other activities include (but are not limited to) developing and implementing new building codes and standards that will make our built environment more energy efficient and resilient to climate change; increasing knowledge of climate change impacts on ocean ecosystems and support the fisheries sector to adapt to these changes; and developing and implementing a national action plan to respond to a broad range of health risks caused by climate change.

Many ongoing federal climate change science activities support government wide actions in fundamental ways as described in the inventory of federal climate change science activities (Annex 7). These include research, monitoring and modelling in order to improve our ability to model the whole earth system for the creation of future climate scenarios and predictions of climate change impacts; greenhouse gases inventories to inform the possible socio-economic pathways for mitigation under international agreements; and the acquisition, analysis and provision of a range of geospatial information, including space-based Earth observation, with applications for climate change actions across the federal government.

Knowledge integration activities, such as impact assessments and the Adaptation Platform, inform actions across the many sectors that federal departments and agencies are mandated to support. With their strong linkages to the stakeholders in specific sectors, departments and agencies respond to sectoral needs for climate change mitigation and adaptation and help deliver effective solutions.

The government supports climate scientists and organisations in the academic sector through funding from the Social Sciences and Humanities Research Council, Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research and the Canada Foundation for Innovation (Annex 8). Collaboration between government and academic scientists is prevalent and an important element in creating an integrated research community in Canada.

Federal science facilities are instrumental in advancing the knowledge needed to make adaptation and mitigation decisions based on evidence. For example, the Canadian High Arctic Research Station in Cambridge Bay (Nunavut) provides a hub for science and technology in Canada's North. Another example is the Agriculture and Agri-Food Canada Ottawa Research and Development Centre, which supports agricultural risk management by providing information on the extent and severity of soil moisture extremes. Furthermore, federal facilities help mobilize the science and technology needed to support Canada's leadership in the field of clean technology to mitigate climate change impacts and improve climate change resilience. For instance Natural Resources Canada perform research and development in the areas of energy efficiency, cleaner fossil fuels, clean transportation, renewable and alternative energy sources, smart grid and artificial intelligence, and material science.

Priorities Targeted at Gaps

This Plan was co-developed by federal departments and agencies with mandates to deliver climate change related policies, programs and services. The range of existing federal climate change science activities was examined to identify where there may be gaps in developing the scientific knowledge and capacity needed to meet present and future goals of the PCF. The PCF consultation process provided valuable information about the key science needs identified by experts, provinces, territories and National Indigenous Organizations (Annex 9). The Plan was designed to target key areas where science should be accelerated, rather than to comprehensively include all existing climate change science activities. Discussions with federal departments and agencies were guided by several criteria (below). From this process, five (5) priority themes were identified.

Criteria

Policy need – focus on commitments under the PCF

- Sectors requiring knowledge to make long term investment decisions;
- Environmentally sensitive and vulnerable regions; and
- Addresses societal vulnerabilities.

Horizontal issue requiring collaboration

- Area crosses the mandates of multiple departments and agencies;
- Requires a multi-disciplinary approach;
- Benefits from the pooling of resources between federal departments and agencies; and
- Benefits from aligning activities performed inside and outside the federal government.

Leverages unique federal capacity

- Clear federal role; and
- Draws on institutional capacity the federal government can provide (e.g., experts, digital and large scale infrastructure such as advanced models and long-term monitoring).

Timely

- Delivers tangible results in the short-, medium- and long-term

Future looking

- Anticipates the big questions/issues in the future and research questions requiring seed investments now; and
- Creates a transformative change, which may involve a higher degree of risk.

D. Priority Action Plans for Climate Change Science

The five priority themes provide a framework for activities to be delivered under this Plan (Table 1). The specific activities needed to address these themes may change over time as

issues evolve and scientific understanding matures. Moreover, emerging policy needs might require changing the scope or nature of the themes. In order to remain relevant, this Plan and its associated action plans will remain flexible and be treated as living documents.

1. *Communicating and Delivering Climate Change Science Knowledge*(Annex 1)

The PCF recognizes that more usable and relevant climate change science knowledge can encourage Canadians to take action on climate change. Despite increased scientific knowledge about climate change impacts and measures for mitigation and adaptation, scientific information is not readily accessible for most Canadians, and they doubt their ability to help address climate change.

Areas of focus in this theme include translating physical, social and economic research related to climate change into findings that resonate with Canadians and developing a whole of government approach to the delivery of science-based communication products, especially on digital media platforms. This work will support the federal government in better communicating climate change science knowledge to encourage Canadians to change their behaviours and take action on climate change.

2. *Carbon Cycle and Sinks* (Annex 2)

The PCF acknowledges the carbon storage potential of ecosystems and includes several actions to conserve the carbon already stored in them. Climate change has the potential to change natural carbon cycles; however, there is a limited understanding of the fate of existing carbon stocks and dynamics of carbon storage under scenarios of climate change. Significant knowledge gaps remain around understanding carbon cycle processes in ecosystems across Canada and the potential of natural carbon sinks to mitigate greenhouse gas emissions.

Activities under this theme will provide a picture of the current state of knowledge, scientific gaps and uncertainties, as well as a path forward to improve understanding of Canadian carbon sources and sinks. They will also improve the ability to model the carbon cycle of oceans, map carbon storage in Canada's national parks and marine conservation areas, and explore the carbon storage potential of northern peatlands under scenarios of climate warming. Research in these areas can inform future directions for mitigation actions, conservation policies, land use and land-use change policies and best practices in the forestry, forest products and agricultural sectors.

3. *Water* (Annex 3)

Climate change is affecting aquatic ecosystems from coast to coast to coast and the quality, distribution and availability of freshwater across Canada. The limited availability of data regarding aquatic ecosystems and watershed health, and the lack of tools for Canadians to visualize, analyze and apply water-related data are impeding their ability to adapt to climate change-related impacts on water resources.

As Canada works to implement the PCF and provide the data, information and tools needed for adaptation decisions, there is an opportunity for the federal government to provide more accessible and integrated water data that can be used to inform water resource

management in a changing climate. Activities under this theme will focus on providing more accessible, comprehensive and integrated water data; increasing our understanding of the impact of climate change on water quality, quantity and availability; and the relationship between groundwater and surface water. This will facilitate the development of water resource models at appropriate scales for forecasting, predicting and decision-making.

4. *Resilient Regions and Communities (Annex 4)*

Climate change is affecting the frequency, duration and intensity of many climate-related hazards and disasters such as floods, wildfires, droughts and extreme weather events. These events affect individuals, groups and sectors differently depending on their vulnerability, exposure to risk and capacity to be resilient. Inequalities can also influence local coping and adaptive strategies.

The PCF aims to reduce climate related hazards and disaster risks; build climate resilience through infrastructure; protect and improve human health and well-being; and support vulnerable regions. Research that focuses on how climate change impacts specific communities, regions and sectors can support their resilience and contribute to actions under the PCF. Activities in this theme will address gaps in our ability to predict droughts, to provide mental health support during and after an extreme weather event and to use urban forests as natural infrastructure for mitigation and adaptation.

5. *Human Dimension of Climate Change (Annex 5)*

Social sciences, Indigenous and local knowledge and humanities have the potential to help shape the development of culturally appropriate and effective climate change policies and programs, including those committed to under the PCF.

The PCF recognizes Indigenous Peoples' climate leadership, and reiterates the federal government's commitment to a renewed nation-to-nation, government-to-government and Inuit-Crown relationship with Indigenous Peoples. One area of focus under this theme will be to synthesize and make accessible evidence on how to meaningfully, inclusively and equitably work with communities and knowledge holders to access and apply Indigenous Knowledge in climate change science assessments.

Another area of focus will be to conduct pilots to gain insights into how and why people and organizations make adaptation and mitigation decisions and act on them. These insights will inform climate change knowledge brokers, federal programs and decision-makers about how to communicate climate science more effectively. Alongside behavioural insights research, activities in this theme will also include enhancing federal economic modelling and analytical capacity to provide the foundation for accessible products helping Canadians understand how climate policies are expected to affect them.

Table 1: Overview of Priority Action Plans for the Targeted Federal Climate Change Science Plan

Theme	1. Communicating and Delivering Climate Change Science Knowledge	2. Carbon Cycle and Sinks	3. Water	4. Resilient Regions and Communities	5. Human Dimension of Climate Change
Result	Canadians have access to useful information in order to make informed decisions on actions for climate change mitigation and adaptation.	Canadians have information about how to protect and enhance carbon sinks, under conditions of a warming climate.	Canadians have information to adapt to water-related climate change impacts.	Canadian regions and communities are more resilient to climate change impacts, especially extreme events, through access to the latest knowledge to inform their planning and responses.	Enhanced climate resilience by empowering Canadians, communities, businesses and governments to make informed adaptation and mitigation decisions using insights from the social sciences, Indigenous and local knowledge and humanities.
Science Outcome	Federal climate change science knowledge is made more usable and relevant to Canadians.	Increased understanding of the carbon dynamics of major Canadian ecosystems and of their mitigation potential, as well as the impacts of land-use change.	Enhanced understanding of the impacts of climate change on the water cycle.	Increased understanding of climate change impacts, especially extreme events. New techniques are developed to enable adaptation and mitigation actions through the systematic consideration of Indigenous Knowledge, local knowledge and science.	Increased understanding of the enabling factors and constraints for adaptation and mitigation responses from a social, economic, cultural and behavioural perspective.
Challenge	<ul style="list-style-type: none"> Complex and competitive media environment. Canadians doubt their ability to help address climate change. Language of scientific information not accessible for most Canadians. 	<ul style="list-style-type: none"> Limited understanding of the future stability of carbon stocks and dynamics of carbon storage under scenarios of climate change. Fragmented carbon science community in Canada with no convening power. 	<ul style="list-style-type: none"> Climate change affects the quality, distribution and availability of freshwater. Impacts on the water cycle are expected to increase risks to infrastructure and communities. Lack of accessible and integrated data, including for oceans and groundwater. 	<ul style="list-style-type: none"> Climate change affects individuals, groups and sectors differently depending on their vulnerability, exposure to risk and capacity to be resilient. Inequalities influence local coping and adaptive capacity. 	<ul style="list-style-type: none"> Need for culturally appropriate and more effective climate policies. Limited understanding of how and why people and organizations make decisions and act on them. Need to communicate the regional and national economic impacts of climate measures and policies to Canadians.
Activities	Accessible Information for Non-Technical Audiences Lead: Natural Resources Canada (NRCan) Governance: Canada's National Climate Change Assessment Advisory Committee	Workshop and Report on Current Understanding of Canadian Carbon Sources and Sinks Lead: ECCC Governance: To be determined	Increased Access to Freshwater Data Leads: NRCan and Statistics Canada Governance: DG Shadow Committee of the Federal Committee on Geomatics and Earth Observations	Drought Forecasting Pilot Lead: AAFC Governance: AAFC/ECCC Memorandum of Understanding	Guidance on the Inclusion of Indigenous Knowledge to Support Climate Action Lead: ECCC Governance: Joint Tables with National Indigenous Organizations and DG Coordinating Committee on the Arctic
	Whole of Government Communication Pilot Lead: Environment and Climate Change Canada (ECCC) Governance: Director General (DG) Adaptation and Resilience Committee	Ocean-Climate Modelling with Improved Carbon Cycle Processes Lead: ECCC Governance: Bilaterally with ECCC and Department of Fisheries and Oceans (DFO)	Linked Open Data Pilot Lead: NRCan Governance: DG Shadow Committee of the Federal Committee on Geomatics and Earth Observations	Addressing Mental Health Impacts of Extreme Events in Indigenous Communities Lead: Health Canada Governance: To be determined	Behavioural Design Pilots on Adaptation and Mitigation Measures Leads: ECCC and SSHRC Governance: DG Adaptation and Resilience Committee
	Examining the Role of Peatlands in Climate Change Mitigation Lead: ECCC Governance: Bilaterally with ECCC and NRCan	Carbon Atlas for Canada's National Parks and National Marine Conservation Areas Lead: Parks Canada Governance: Parks/NRCan Memorandum of Understanding	Identify Hotspots in Northern and Western Canada Lead: ECCC Governance: Ad-hoc; depending on hotspots identified	Urban Forest Pilot Projects to Enhance Climate Change Mitigation and Adaptation Lead: NRCan Governance: To be determined	Development, Enhancement and Application of Economic Modelling Lead: ECCC Governance: Internal ECCC governance
			Assessment of Cumulative Effects on Forested Watersheds Lead: NRCan Governance: To be determined		
			Water Sustainability Metrics Tools Lead: Agriculture and Agri-Food Canada (AAFC) Governance: AAFC/ECCC Memorandum of Understanding		
			Using Earth Observation Data for Water Monitoring Lead: AAFC Governance: DG Shadow Committee of the Federal Committee on Geomatics and Earth Observations		

E. Implementation

Resources and Timelines

The activities in this Plan will be funded using existing resources. Activity leads will work with contributors to realign and pool existing federal resources, and when appropriate, harness and enhance the synergies between intramural and extramural science performance. In this context, the federal funding agencies will play an important role.

The Plan will be launched in fiscal year 2017-18. It will be revisited periodically and adjusted as necessary to enable experimentation with models of delivery and to address emerging science priorities and policy needs. This Plan will be delivered from 2017 to 2020.

The Role of Academia and the Federal Funding Agencies

To achieve the outcomes of the Plan, engagement with academia will be critical to advance the science needed to support the implementation of the PCF. Federal departments and agencies will use all of the tools at their disposal to foster collaboration with the academic sector on the Plan's priority themes including for example, targeted grants and contributions, co-location opportunities and targeted publications.

In addition, the federal granting agencies are integral to leveraging the science performed outside of government. The Canadian Institutes of Health Research (CHIR), the Social Sciences and Humanities Research Council (SSHRC), and the Natural Sciences and Engineering Research Council (NSERC), and the Canadian Foundation for Innovation (CFI) provide a significant proportion of the funding for Canadian extramural climate change research (Annex 8). Collaboration and data sharing between actors inside and outside Government are needed to produce the sophisticated information that supports decision making and planning for adaptation and mitigation. There is an opportunity for the Councils to further support joint initiatives fostering multidisciplinary climate change research and to establish new strategic partnerships with federal departments and agencies, enabling stronger linkages between federal scientists and academia.

However, funding pressures on the granting councils, including the ending of NSERC's Climate Change and Atmospheric Research program, which funded large-scale research networks to perform fundamental climate change research, may limit their ability to launch targeted calls on climate change science and fund research networks and partnerships.

Governance approach

The governance of federal intramural and federally funded science appears to be disconnected from existing climate change policy governance bodies. The most notable is the lack of participation of the granting agencies (Annex 10 and 11). There is an opportunity to build on the emerging governance from the PCF to strengthen linkages between climate change policy development and science planning, funding and performance. Continued engagement between federal climate change science and policy

communities will be needed for the Plan's science outcomes to be translated into policy and management decisions.

1. Plan Oversight

An update on the Plan will be presented at least once a year to the PCF Deputy Ministers Oversight Committee (DMOC). DMOC will provide strategic direction and implementation oversight. This includes approving the Plan and related action plans, identifying emerging policy needs, and strengthening departmental and agency engagement in the Plan in pursuit of an enhanced whole of government approach to the funding and performance of climate change science in support of climate change policy.

The PCF Assistant Deputy Ministers Committee (ADMC) will provide oversight and strategic direction for the Plan, as well as all associated action plans. These will be presented at least twice a year to the committee which will be responsible for:

- providing implementation advice and assessing progress;
- ensuring alignment with policy objectives; and
- identifying strategic implications and building executive consensus prior to seeking approval from DMOC.

2. Action Plans Implementation and Reporting

Coordinated delivery of activities identified in the action plans, as well as measuring and reporting on progress will be operationalized through the following existing Director General (DG) committees:

- PCF DG Adaptation and Resilience Committee (Theme 1, 4 and 5);
- Science and Technology Communications Committee (Theme 1);
- Shadow Committee of the Federal Committee on Geomatics and Earth Observations (Theme 3); and
- Coordinating Committee on the Arctic (Theme 5).

When relevant, existing collaboration mechanisms such as Memoranda of Understanding between departments or the PCF Joint Tables with First Nations, Inuit, and the Métis Nation will be used in lieu of DG committees (See Table 1). Theme 2 (*Carbon Cycle*) and *Sinks* will report through emerging governance on mitigation under the PCF.

Roles and responsibilities

A secretariat will be created to support reporting to the PCF DMOC and ADCM in collaboration with the PCF Implementation Office. ECCC and NRCan will chair the secretariat on a rotating basis and will:

- review action plans with respective leads and update them as needed to ensure linkages between emerging policy needs and priorities;
- report on critical milestones to the PCF ADCM at least twice a year;
- report on critical milestones to the PCF DMOC at least once a year; and
- invite, with the support of the PCF Implementation Office and when relevant, representatives from the three federal granting agencies and the office of the Chief Science Advisor to the PCF DMOC and ADCM meetings.

For each action plan, activity leads will be responsible for reporting progress on critical milestones to the secretariat. All departments and agencies are responsible for aligning organizational resources with action plan activities in order to achieve the intended results.

Engagement and Communication

When necessary and relevant, additional targeted engagement will take place with non-federal partners and users through existing mechanisms identified in each of the action plans.

Accountability and transparency

The Plan and action plans will be communicated to the public, and reports on progress will be made publically available.

Annexes

Annex 1 –Communicating and Delivering Climate Change Science Knowledge Action Plan



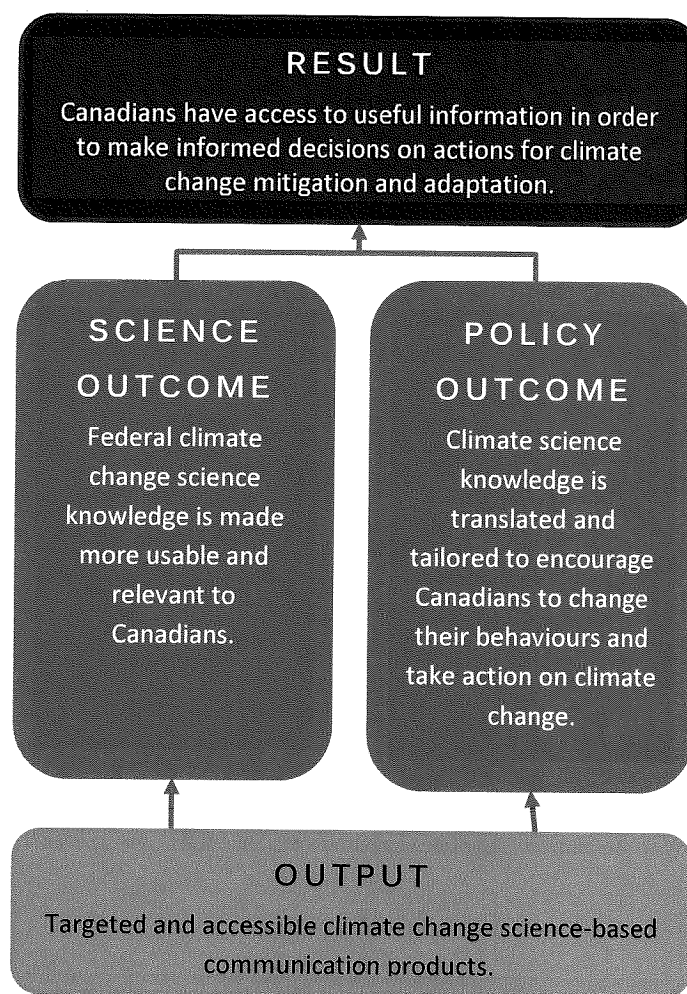
COMMUNICATING AND DELIVERING CLIMATE CHANGE SCIENCE KNOWLEDGE ACTION PLAN

OUR CHALLENGE

Recent public-opinion research on climate change reveals that, while most Canadians believe climate change is happening, they doubt their ability to help address it.² This is compounded by the fact that scientific information is often presented in ways that make it difficult to use in daily decision making. As such, Canadians need more accessible science-based products that provide information on climate change impacts and solutions. They also need products to be made available through new media outlets and social media platforms, together with traditional media outlets (e.g., print media). Focusing efforts on targeted themes relevant to people's daily lives and enhancing coordination among federal departments and agencies would facilitate the effective delivery of messages in a crowded and competitive communication environment.

Individuals and organizations rarely make decisions based on scientific information

² Environment and Climate Change Canada – Public Opinion Research (POR) on Climate Change; POR 021-16, December 13, 2016




alone. As such, improving the effectiveness of the communication of science information requires an understanding of factors that affect people's actions, including their values and beliefs. Work proposed under this Theme will also leverage work undertaken for the "Human Dimensions of Climate Change" Theme of the *Targeted Federal Climate Change Science Plan*, which seeks to understand how to foster individual and collective action with respect to climate change mitigation and adaptation.

WHAT ARE WE BUILDING ON

The federal government produces and disseminates authoritative climate change information, guidance and tools to help Canadians adapt to and mitigate climate change. For example, since 2012, federal initiatives under **Canada's Climate Change Adaptation Platform** have equipped decision-makers in regions and industries with the tools and information to adapt to a changing climate. In addition, the federal government has been supporting climate change science and research based at post-secondary institutions through grants and funding offered by Canada's federal granting agencies, including **Canada Research Chairs** and the **International Research Initiative on Adaptation to Climate Change**.

The *Pan-Canadian Framework on Clean Growth and Climate Change* (PCF) recognizes the need to translate scientific information and Indigenous Knowledge into action. Initiatives supporting the implementation of the PCF include, for example: regional contributions to the science assessment **Canada in a Changing Climate: Advancing our Knowledge for Action**, a series of authoritative science and information products about changing climatic conditions, impacts and adaptation; and new funding for the establishment of the **Canadian Centre for Climate Services** (CCCS). The CCCS will provide authoritative climate data, information and tools to support adaptation decision-making that respond to users' needs.

WHAT WE WILL DO


	ACTIVITY 1.1 (Existing being amplified) Accessible Information for Non-Technical Audiences
Deliver accessible national, regional and sectoral knowledge assessment products on how Canada's climate is changing, associated impacts and adaptation.	

Science Question: How can the physical, social and economic research related to climate change be leveraged and translated into findings that will assist decision makers in Canada?

Policy Question: How can the federal government better communicate climate change science knowledge and facilitate its uptake by target audiences?

DEPARTMENTS OR AGENCIES	
<p>Lead: Natural Resources Canada (NRCan) Director General (DG) Hazards, Adaptation and Operations Branch, Lands and Minerals Sector.</p> <p>Contributors: Environment and Climate Change Canada (ECCC), Health Canada (HC), Indigenous and Northern Affairs (INAC), and others to be determined (TBD).</p>	
TIMELINE	
2017-18	<p>Q3</p> <ul style="list-style-type: none"> Establish a multi-stakeholder Advisory Committee, deliver regional workshops and establish on-line collaboration fora to better understand user needs and support Canada's next national climate assessment process (<i>Canada in a Changing Climate: Advancing our Knowledge for Action</i>). Establish a web presence for <i>Canada in a Changing Climate</i> where website visitors can learn about the assessment process and have the opportunity to engage. Engage with potential partners, e.g., provinces, industry, universities, research institutes and Indigenous Peoples, to scope forest sector Regional Integrated Assessments (RIAs).
2018-19	<p>Q3</p> <ul style="list-style-type: none"> Complete <i>Canada's Changing Climate</i> report, the first of five reports in Canada's climate assessment process, which will serve as the climate science foundation for other national assessment products. Leverage existing partnerships and networks, within and outside the federal government, in order to communicate and engage target audiences. Continue working with partners to develop forest sector RIAs.
2019-20	<p>Q1-2</p> <ul style="list-style-type: none"> Staggered release of chapters from the national assessment reports, <i>National Issues</i>, <i>Regional Perspectives</i>, and <i>Enhanced Synthesis</i>, in order to sustain interest of the target audiences. <p>Q4</p> <ul style="list-style-type: none"> Communicate results of ongoing work on forest sector RIAs, in order to share examples of how science knowledge can inform adaptation, via networks such as the online Forestry Adaptation Community of Practice.
2020-25	<ul style="list-style-type: none"> Complete national assessment reports: <i>National Issues</i>, <i>Regional Perspectives</i>, <i>Enhanced Synthesis</i>, and the <i>National Climate Change and Health Vulnerability and Adaptation Technical Report</i>. Release other user-centred targeted assessment outreach products. Communicate and engage target audiences for each release by leveraging existing partnerships and networks within and outside the federal government. Evaluate the effectiveness of forest sector RIAs communication activities in increasing access to and understanding of data and tools needed to conduct assessments, and in enhancing the capacity of others to undertake similar work.
RESOURCES (Total estimate using existing resources)	
<p>NRCan: 7 full-time equivalents (FTE) and \$3.65M in Grants and Contributions and Operations and Maintenance (O&M).</p>	

USERS
<ul style="list-style-type: none"> • Adaptation decision-makers and policy makers • Municipalities and communities • Scientists and knowledge brokers • Canadian public
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
Government of Canada <ul style="list-style-type: none"> • National and sectoral science assessments within the climate science and adaptation programs of multiple departments, including NRCan, ECCC, HC and INAC. • CCCS supports adaptation decision-making by producing data and scenario products, and developing and disseminating climate information. • Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities.

	ACTIVITY 1.2 (New collaboration) Whole of Government Communication Pilot
Develop a series of communication products and engagement strategies, including a whole of government media campaign to reach targeted audiences.	

Science and Policy Questions are the same as activity 1.1

DEPARTMENTS OR AGENCIES
Leads: ECCC Director General (DG) Communications Branch and DG Science and Policy Technology Strategies, Science and Technology (S&T) Branch. Contributors: NRCan, and to be determined (TBD) the Social Sciences and Humanities Research Council of Canada (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Canadian Institutes of Health Research (CIHR).
TIMELINE
<div>2017-18</div> <div> Q3-Q4 <ul style="list-style-type: none"> • Identify thematic areas and target audiences through collaboration with federal departments and agencies. • Conduct a public-environment analysis to: (1) assess public and media interests and potential communication challenges, and (2) inform the design and delivery of communication products and campaigns. • Develop a multi-departmental communication and engagement strategy that will foster a whole-of-government approach to communication. • Undertake multi-departmental thematic media campaign to release communication products focused on non-traditional media, such as digital interactive content and social media content. </div>

2018-20	Q1-Q4 <ul style="list-style-type: none"> Evaluate communication products and strategies, and adjust them to maximize effectiveness.
	Q3-Q4 <ul style="list-style-type: none"> Continue to evolve communication strategies to take advantage of new developments and research in science communication, including behavioural design.
RESOURCES (Total estimate using existing resources)	
ECCC: 1 FTE	
USERS	
<ul style="list-style-type: none"> Target audience for thematic social media campaign: Canadian families, youth, municipalities and communities. Knowledge brokers, other federal departments and other levels of government. Private sector: Small- and medium-sized businesses, large businesses, and professional associations. National Indigenous Organizations and Indigenous peoples and communities. Non-governmental organizations. 	
LINK WITH EXISTING FEDERAL INITIATIVES AND POLICIES	
Government of Canada <ul style="list-style-type: none"> Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities. 	

GOVERNANCE

- The PCF Assistant Deputy Ministers (ADM) Committee will provide oversight and strategic direction, on a bi-annual basis, for all Action Plans under the *Federal Targeted Climate Change Science Plan*.
- At the activity level, existing governance structures will be used to strengthen science to policy linkages and collaboration with the science community working on IK, adaptation and economic research. For Activity 1.1, progress will be reported to Canada's National Climate Change Assessment Advisory Committee. For Activity 1.2, progress will be reported to DG Adaptation and Resilience Committee.
- Lead Director Generals (DGs) or Directors will be responsible for reporting on activity milestones at least once a year to the identified committees. When relevant, representatives from the Tri-Council, the three federal research granting agencies, will be invited.
- Lead and contributing departments are each responsible for aligning organizational resources with activities in order to achieve the intended results.

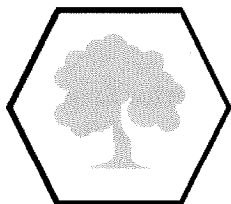
Draft For Discussion

- The Action Plan will be evergreen. Flexibility will enable experimenting with models of delivery and addressing emerging policy needs.

ENGAGEMENT AND COMMUNICATION

- When necessary, targeted federal engagement will take place through the Director General (DG) Adaptation and Resilience Committee and the DG S&T Communications Committee.
- When necessary, engagement with external stakeholders will take place through the national science assessment multi-stakeholder Assessment Advisory Committee and the Adaptation Platform.

Annex 2 –Carbon Cycle and Sinks Action Plan

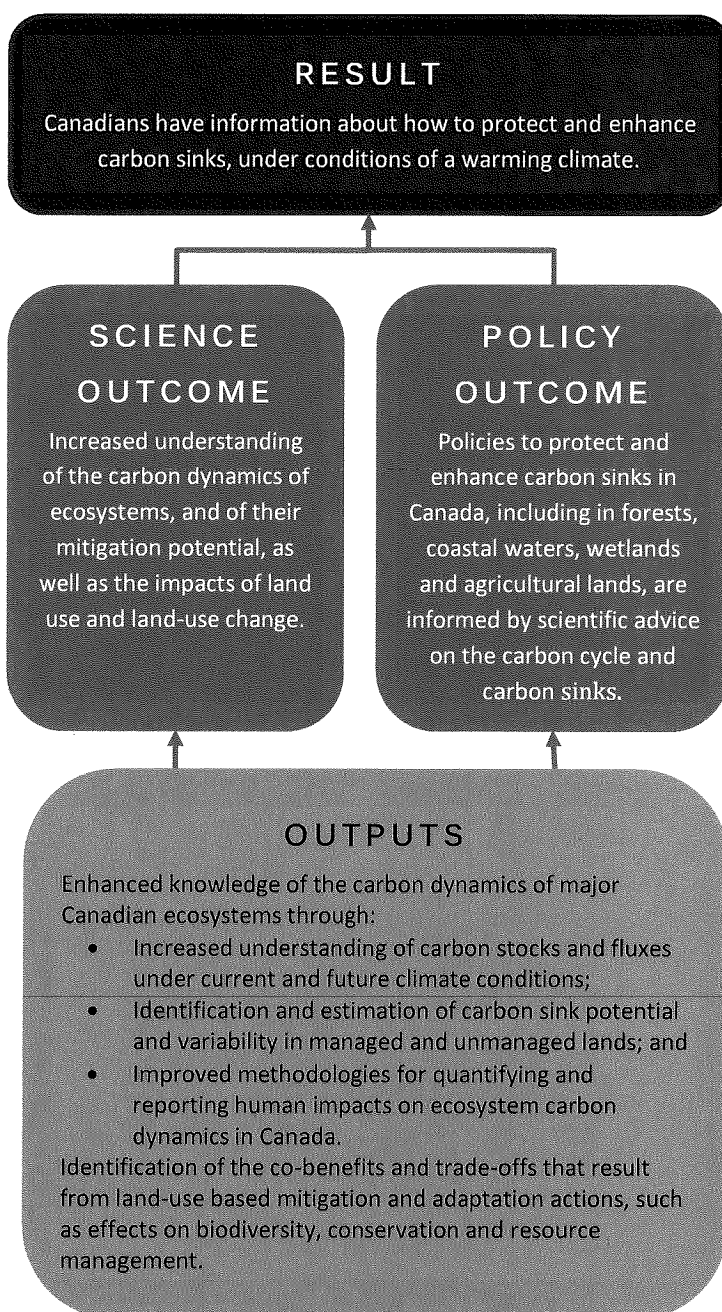


CARBON CYCLE AND SINKS ACTION PLAN

OUR CHALLENGE

Climate change has the potential to change natural carbon cycles; however, the response of different terrestrial and aquatic ecosystems to climate change is not well understood. Furthermore, there are many unanswered questions regarding the fate of existing carbon stocks under scenarios of climate change and increasing disturbances due to human activities and climate related hazards. As a result, significant knowledge gaps remain around the potential to mitigate greenhouse gas (GHG) emissions through natural carbon sinks in Canada. Research in these areas can inform future directions for mitigation actions, conservation policies, land-use policies and best practices in the forestry, forest products and agricultural sectors.

Foundational elements for developing a better picture of carbon stocks and fluxes in terrestrial and aquatic ecosystems across Canada include more detailed information about the distribution of ecosystem types, especially wetlands, and also a better understanding of carbon cycle processes in unmanaged lands and aquatic areas which are not as



well understood as those that are managed.

Mitigation and adaptation policies that encourage land use and land-use change may have impacts on other ecosystem services such as changes in biodiversity, food production and the availability of natural resources. Research is needed to better understand the interactions between different ecosystem services in order to develop policies that support both economic prosperity and a healthy environment.

WHAT WE ARE BUILDING ON

Federal researchers study the carbon cycle dynamics of forests, agricultural lands, wetlands and oceans in order to better understand the impacts of climate change on these ecosystems, to quantify anthropogenic (human-caused) GHG emissions and removals for reporting in the annual **National GHG Inventory**, and to assess land-based climate change mitigation strategies. Federal carbon cycle research also supports the development of the **Canadian Terrestrial Ecosystem Model** which represents the carbon cycle in the **Canadian Earth System Model**. The Natural Science and Engineering Research Council (NSERC) and the Canadian Foundation for Innovation (CFI) fund carbon cycle research in academic institutions and engagement with the academic community is an important part of this action plan.

The *Pan-Canadian Framework on Clean Growth and Climate Change* (PCF) acknowledges the carbon storage potential of ecosystems and includes several actions to conserve the carbon already stored in these systems. In collaboration with provinces and territories, actions aim to protect and enhance carbon sinks through land-use and conservation measures, and enhance innovation in GHG-efficient sustainable agricultural and forestry management practices. The federal, provincial and territorial government also committed to encourage the increased use of wood products in construction because this will help to conserve forest carbon stocks by locking in the carbon stored in that wood for a long period of time, and means there can be less use of other non-renewable more emission-intensive products.

WHAT WE WILL DO



ACTIVITY 2.1 (New joint work)

Workshop and Report on Current Understanding of Canadian Carbon Sources and Sinks

Report on current state of knowledge, scientific gaps and uncertainties and a path forward to improved understanding of Canadian carbon sources and sinks.

Science Question: What is the current state of scientific knowledge about the carbon cycle including carbon stored in unmanaged and managed ecosystems in Canada?

Policy Question: Where should policy efforts be focused to realize the potential of storing carbon in unmanaged and managed ecosystems, while minimizing possible negative impacts on other ecosystem services?

DEPARTMENTS OR AGENCIES	
<p>Lead: Environment and Climate Change Canada (ECCC) Director General (DG) Atmospheric Science and Technology (S&T), S&T Branch.</p> <p>Contributors: Department of Fisheries and Oceans Canada (DFO), Natural Resources Canada (NRCan), Agriculture and Agri-Food Canada (AAFC), Canadian Space Agency (CSA) and to be determined (TBD) the Natural Sciences and Engineering Research Council of Canada.</p>	
TIMELINE	
2017-18	<p>Q4</p> <ul style="list-style-type: none"> Host a carbon cycle science workshop to bring together carbon cycle science experts, including both academic and government experts, in order to engage in a focused discussion on existing carbon cycle science activities and to identify and prioritize scientific gaps and uncertainties.
2018-19	<p>Q4</p> <ul style="list-style-type: none"> Complete a workshop report, which identifies and prioritizes the scientific gaps and uncertainties, and articulates a path forward towards an improved understanding of Canadian carbon sources and sinks.
2019-20	<p>Q4</p> <ul style="list-style-type: none"> Update the Carbon Cycle and Sinks Action Plan to include targeted science activities that were defined through the workshop report. Activities and timing will depend on availability of resources.
RESOURCES (Total estimate using existing resources)	
ECCC: 0.5 Full time equivalent (FTE) and \$32K Operations and Maintenance (O&M)	
USERS	
<ul style="list-style-type: none"> Researchers Policy communities at federal, provincial, territorial and municipal levels Science communicators Canadians 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> ECCC: Climate research and modelling, GHG emission quantification and observations-based validation. AAFC: Carbon research and models for agricultural ecosystems. NRCan: Carbon research and modelling, GHG emission quantification and observations-based validation, and mitigation analyses for forest ecosystems. DFO: Carbon research and models for ocean ecosystems. CSA: Space-based Earth observation systems. 	

**ACTIVITY 2.2 (Existing being amplified)****Ocean-Climate Modelling with Improved Carbon Cycle Processes**

Development and enhancement of high-resolution ocean-climate modelling, with improved representation of carbon cycle processes.

Science Questions: How is the global ocean carbon sink projected to change in the future?
How are carbon stocks in Canadian coastal waters projected to change?

Policy Question: How will changes in ocean carbon sinks affect cumulative carbon dioxide emission budgets consistent with meeting Paris Agreement climate goals?

DEPARTMENTS OR AGENCIES	
Lead: ECCC DG Atmospheric S&T, S&T Branch. Contributors: DFO.	
TIMELINE	
2017-18	Q2 <ul style="list-style-type: none"> Complete a new version of the Canadian Earth System Model with improved representation of ocean carbon.
2018-19	Q4 <ul style="list-style-type: none"> Develop a climate change scenario simulation with updated ocean carbon processes, including projected changes to the ocean carbon sink. Inclusion of this new simulation in the international data repository in support of the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report.
2019-21	Q4 <ul style="list-style-type: none"> Develop and deliver high-resolution global projections of ocean carbon.
RESOURCES (Total estimate using existing resources)	
ECCC: 1 FTE DFO: No new resources	
USERS	
<ul style="list-style-type: none"> Canadian climate researchers and climate service providers The international community as represented by IPCC member states Coastal communities 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> ECCC: Canadian Earth System Model, model downscaling and model output in support of IPCC assessment reports. DFO: High-resolution ocean model development for the Canadian Earth System Model. 	


**ACTIVITY 2.3 (New collaboration)****Examining the Role of Peatlands in Climate Change Mitigation**

Research project to test hypothesis that northern peatlands could become a net carbon sink rather than a source under warmer and wetter climate conditions.

- Science Questions:** What is the current state of knowledge about peatlands and their response to climate change?
Can peatlands continue to act as a carbon sink under warmer and wetter climate conditions?
- Policy Question:** Where should policy efforts be focused to realize the potential of peatlands in climate change mitigation?

DEPARTMENTS OR AGENCIES	
Lead: ECCC DG Science and Risk Assessment, S&T Branch. Contributors: NRCan, AAFC, Parks Canada Agency (PCA).	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> Establish a formal funding arrangement with the lead investigator at the Université du Québec à Montréal. Establish a federal advisory panel to make recommendation to the lead investigator at the Université du Québec à Montréal on the scope of the project to ensure its feasibility, as well as provide support and feedback throughout the project. Conduct a literature review to identify research gaps with respect to peatlands and climate change. Draft a project proposal.
2018-19	Q1-Q2 <ul style="list-style-type: none"> Define the scope of the project through the identified research gaps including: The research hypotheses; The methods and timelines; and Project responsibilities.
2019-22	Q4 <ul style="list-style-type: none"> Undertake the project by following the identified methods and collecting the data. Receive support and feedback from the advisory panel. Analyze the data obtained and identify significant findings. Staggered release of preliminary research findings made open to the public. Publication of the final report and related peer-reviewed scientific publications.
RESOURCES (Total estimate using existing resources)	
ECCC: 1FTE and up to \$300K O&M	
USERS	

<ul style="list-style-type: none"> • Government scientists, policy-makers and regulators. • Academic and practitioner communities.
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
<ul style="list-style-type: none"> • ECCC: Climate research and modelling, GHG emission quantification and observations-based validation. • AAFC: Carbon research and models for agricultural ecosystems. • NRCan: Carbon research and models for forest ecosystems, Canadian Module for (forested) Peatland Simulations. • PCA: Carbon Atlas for Canada's National Parks and National Marine Conservation Areas



ACTIVITY 2.4 (Existing being amplified)

Carbon Atlas for Canada's National Parks and National Marine Conservation Areas

Mapping of carbon stocks in Canada's National Parks and National Marine Conservation Areas.

- Science Question:** What is currently know about the carbon stocks and fluxes within the terrestrial and aquatic ecosystems of Canada's national parks (NP) and national marine conservation areas (NMCA)?
- Policy Question:** How can conservation policies and plans support the protection and enhancement of carbon sinks in Canada?

DEPARTMENTS OR AGENCIES	
Lead: PCA Chief Ecosystem Scientist, Office of the Chief Ecosystem Scientist. Contributors: NRCan.	
TIMELINE	
2017-18	<p>Q4</p> <ul style="list-style-type: none"> • Develop a carbon atlas to assess and map carbon stocks and carbon fluxes (i.e., carbon dioxide and methane) within the terrestrial and aquatic ecosystems of Canada's NPs and NMCAs. • Specifically, the carbon atlas and associated geospatial database will: • Estimate and map baseline carbon stocks in each NP and NMCA; • Estimate the rate of carbon sequestration and fluxes in and out of each NP and NMCA; and • Evaluate how carbon fluxes in NP and NMCA ecosystems may change in response to projected changes in climate, species distribution, permafrost dynamics and fire regimes.

2018-19	Q4 <ul style="list-style-type: none"> Continue carbon atlas development in preparation for the first edition. Deliver the first edition of the carbon atlas, including a system-wide report and database based on best available information, for March 2019. The atlas will also include an action plan to address information needs and key uncertainties.
	RESOURCES (Total estimate using existing resources)
	PCA: 1.2 FTEs and \$45K O&M NRCan: TBD
	USERS
	<ul style="list-style-type: none"> Government scientists, policy-makers and regulators Academic and practitioner communities
	LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
	<ul style="list-style-type: none"> ECCC: Climate research and modelling, GHG emission quantification and observations-based validation. NRCan: Carbon research and models for forest ecosystems, spatially-explicit high-resolution carbon dynamics modelling for terrestrial ecosystems.

GOVERNANCE

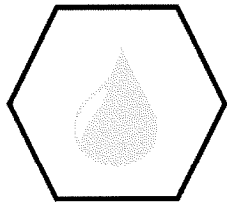
- The PCF Assistant Deputy Ministers (ADM) Committee will provide oversight and strategic direction, on a bi-annual basis, for all Action Plans under the *Federal Targeted Climate Change Science Plan*.
- At the activity level, existing governance structures will be used to strengthen science to policy linkages and collaboration with the science community working on IK, adaptation and economic research. For Activity 2.1, governance will be determined. For Activity 2.2, progress will be reported bilaterally with ECCC and DFO. For Activity 2.3, progress will be reported bilaterally with ECCC and NRCan. For Activity 2.4, progress will be reported through the existing Memorandum of Understanding between PCA and NRCan.
- Lead Director Generals (DGs) or Directors will be responsible for reporting on activity milestones at least once a year to the identified committees. When relevant, representatives from the Tri-Council, the three federal research granting agencies, will be invited.
- Lead and contributing departments are each responsible for aligning organizational resources with activities in order to achieve the intended results.
- The Action Plan will be evergreen. Flexibility will enable experimenting with models of delivery and addressing emerging policy needs.

ENGAGEMENT AND COMMUNICATION

Draft For Discussion

- When necessary, additional targeted engagement will take place through the networks of relevant federal granting agencies.

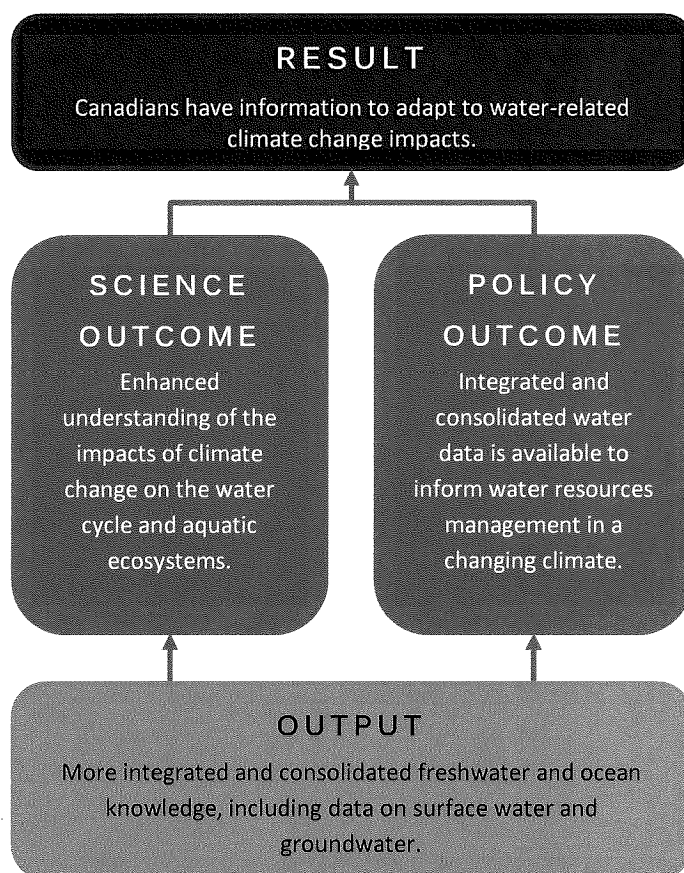
Annex 3 – Water Action Plan



WATER ACTION PLAN

OUR CHALLENGE

Climate change is affecting the quality, distribution and availability of freshwater across Canada. For groundwater-dependent communities, changes in precipitation patterns may result in a decrease in aquifer recharge, and, in coastal communities, it may increase saltwater intrusion due to sea level rise.³ Canada as a whole has become wetter, although there is notable variability across the country and in different seasons.⁴ In most of southern Canada, there has been a decrease in snowfall and an increase in rainfall. In the future, it is predicted that there will be more droughts in the southern Prairies. In the Arctic, climate change is increasing precipitation and thawing permafrost, which is leading to downstream changes to rivers, lakes, wetlands and groundwater. At the same time, aquatic ecosystems in Canada are undergoing significant changes in structure and dynamics, which are related to a combination of climate change, natural variability, and human activities. It is



³ Andrey et al (2014): Water and Transportation Infrastructure; in Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, ON, p. 233-252.

⁴ Bush et al (2014): An Overview of Canada's Changing Climate; in Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, ON, p. 23-64.

expected that Canada's oceans will become warmer, fresher, more acidic and less oxygenated (below the surface), impacting the aquatic ecosystems and coastal infrastructure that support significant economic activity in vulnerable Canadian coastal communities.

The lack of available and accessible data on the health of watersheds, and the lack of tools for Canadians to visualize, analyze and apply water-related information is hampering their ability to adapt to climate change-related impacts on the water cycle.⁵ In order to support the implementation of the PCF, there is a need to provide access to more comprehensive, integrated and consolidated water data that can be used to inform decisions on adaptation and to mitigate risks. Integration of water data will facilitate the development of water resource models at the appropriate scale, for forecasting, predicting and decision making.

A more coordinated federal approach to address water and climate change science-related challenges and opportunities would also produce co-benefits for other federal initiatives, such as increasing greater transparency around science, providing data and evidence to support environmental assessments, improving environmental performance of the energy sector and improving drinking water quality for Indigenous communities.


WHAT WE ARE BUILDING ON

The federal government produces and disseminates science and data on the impacts of environmental change on freshwater and marine water resources. Activities include: providing **national statistics on freshwater** supply and demand from economic sectors; collecting and disseminating **water quality and quantity monitoring data** that can be used to model the impacts of climate change and land-use changes; and developing tools like the **Canadian Extreme Water Level Adaptation Tool**, which provides data on future water-level extremes and changes in waves that impact coastal infrastructure. The federal government also invests in water-related research through **Canada's federal granting agencies**, including the **Global Water Futures Solutions**, a University of Saskatchewan-led collaborative initiative on water science and climate change.

The *Pan-Canadian Framework on Clean Growth and Climate Change* (PCF) aims to support adaptation efforts in vulnerable coastal and marine areas and Arctic ecosystems, and to provide the data, information and tools needed for adaptation decisions. Under the PCF, continued investments in the **Aquatic Climate Change Adaptation Services Program** will help further understand the effects of climate change on aquatic ecosystems and coastlines, and new investments supporting **agricultural science and innovation** on climate change will improve soil and water conservation.

⁵ World Wildlife Fund-Canada (WWF-Canada) 2017 Watershed Reports.

WHAT WE WILL DO

	ACTIVITY 3.1 (New collaboration) Increased access to freshwater data
Increased access to freshwater data on the Federal Geospatial Platform and Open Maps.	

Science Question: How will climate change impact water quality, quantity and availability, and the relationship between groundwater and surface water?

Policy Question: Do we have the data and information needed to assess, reduce risks and help manage watersheds in a changing climate (e.g., in the context of major project proposals)?

DEPARTMENTS OR AGENCIES	
Leads: Natural Resources Canada (NRCan) Director General (DG) Canada Centre for Mapping and Earth Observation, Strategic Policy and Results Sector and Statistics Canada (StatCan) DG Environment, Energy, and Transportation Statistics Division, Agriculture, Energy, Environment and Transportation Statistics Branch.	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> A suite of map layers showing water demand/supply ratios and water quality are made accessible through the Federal Geospatial Platform (FGP) and its public interface Open Maps, including: <ul style="list-style-type: none"> Ratio of surface freshwater intake to water yield, by drainage region; Water yield variability index, by drainage region; and Median values of monthly maximum turbidity in raw surface water sources, by drainage region.
RESOURCES (Total estimate using existing resources)	
StatCan: 0.25 full time equivalent (FTE) NRCan: To be determined (TBD)	
USERS	
<ul style="list-style-type: none"> Policy-makers Regulators Academia 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
Government of Canada <ul style="list-style-type: none"> Review of environmental and regulatory processes. Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities. 	

- 2016 whole-of-government narrative on water which mapped departmental activities related to water and identified potential opportunities and challenges.

StatCan

- Biannual release of water use data.



ACTIVITY 3.2 (Existing being amplified)

Linked Open Data (LOD) pilot

Pilot project to test LOD for online sharing of hydrology data, including groundwater data, within Canada and across the Canada-United States (U.S.) border.

Science and Policy Questions are the same as for activity 3.1

DEPARTMENTS OR AGENCIES

Leads: NRCan DG Canada Centre for Mapping and Earth Observation, Strategic Policy and Results Sector and NRCan DG Geological Survey of Canada, Lands and Minerals Sector.

Contributors: International Joint Commission, U.S. Geological Survey.

TIMELINE


2017-18	Q2-Q3 <ul style="list-style-type: none"> • Conduct preliminary work to set up the pilot area for the Champlain-Richelieu watershed, which includes establishing the requirements and architecture needed for collecting hydrological data linked across Canada and the U.S., including groundwater data.
	Q3-Q4 <ul style="list-style-type: none"> • Initiate the pilot and: <ul style="list-style-type: none"> • Prepare the data from multiple data sources for the pilot area in Canada; • Test the LOD architecture using existing systems and test data within Canada; and • Use a common web browser to explore hydrological data that are available in multiple disparate data systems in order to track relationships between hydrographic features and stream gauges, weather stations, groundwater data or other hydrographic networks.
2018-19	Q1-Q3 <ul style="list-style-type: none"> • Extend the pilot to the U.S., which includes data preparation, architecture refinement and testing.
	Q3-Q4 <ul style="list-style-type: none"> • Report on the scalability potential to other types of data (e.g., socio-economic) and to the FGP. The pilot will develop an architecture and prototype implementation that will be scalable and reusable for other watersheds.

RESOURCES (Total estimate using existing resources)

NRCan: 2 FTE

USERS

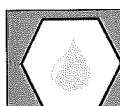
<ul style="list-style-type: none"> Hydrology and climate change assessment experts Adaptation decision-makers and policy makers Municipalities, water management boards and bodies Professional associations and industry sectors, including infrastructure and agriculture
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
<ul style="list-style-type: none"> NRCan: Groundwater Geoscience Program ECCC: Water Survey of Canada's hydrometric databases Government of Canada: Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities

	ACTIVITY 3.3 (Existing being amplified) Identify hotspots in northern and western Canada
Identify hotspots in northern and western Canada, where water resources and ecosystem health will be most affected by changes in water availability.	

Science and Policy Questions are the same as for activity 3.1

DEPARTMENTS OR AGENCIES	
Lead: Environment Canada and Climate change (ECCC) DG Water Science and Technology, Science and Technology Branch (S&T). Contributors: TBD	
TIMELINE	
2017-18	Q4 <ul style="list-style-type: none"> Measure historical changes and variability in western Canadian hydro-climatic variables to identify differences in the amount and timing of freshwater, which in turn affect water resource sectors and ecosystem health.
2018-19	Q4 <ul style="list-style-type: none"> Model future changes in these same variables in order to aid in the identification of vulnerable regions/watersheds where water resource sectors and ecosystem health may be most affected. Identify hotspots of change (and hotspots of uncertainty) in hydroclimate, streamflow and water chemistry within northern Canada's permafrost domain.
2019-20	Q4 <ul style="list-style-type: none"> Assess the ability of current generation ECCC models to represent changes in hydroclimate, streamflow and water chemistry across northern Canada's permafrost regions.
RESOURCES (Total estimate using existing resources)	
ECCC: 10 FTE and \$228K Operations and Maintenance (O&M)	

USERS
<ul style="list-style-type: none"> • Federal, territorial and provincial governments • Industry • Academia
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
<ul style="list-style-type: none"> • DFO: Near-shore marine activities. • Agriculture Agri-Food Canada (AAFC): Hydro-climatic extremes, droughts and excessive moisture. • Global Water Futures: University of Saskatchewan-led program that focuses on solutions to water threats in an era of global change.


**ACTIVITY 3.4 (Existing being amplified)****Assessment of cumulative effects on forested watersheds**

Effects of climate change on water quantity and quality in forest ecosystems, using the Turkey Lake Watershed (TLW) near Lake Superior as a case study and reference site.

Science and Policy Questions are the same as for activity 3.1

DEPARTMENTS OR AGENCIES	
Lead: NRCan DG Great Lakes Forestry Centre Canadian Forest Service. Contributor: ECCC.	
TIMELINE	
2017-18	Q4 <ul style="list-style-type: none"> • Make comprehensive long-term data sets, which evaluate the cumulative impacts of a warming climate, climate variability and human activities on water resources in a forested ecosystem, accessible on the FGP. Early data access includes stream flow and water quality measurements from 13 headwater catchments.
2018-19	<ul style="list-style-type: none"> • Continue to make comprehensive long-term data sets accessible on the FGP, including stream flow and water quality measurements from 5 second order streams and 5 lakes. • Deliver a knowledge synthesis report for a non-technical audience on the extent and range of climate change impacts on the watershed and forest ecosystems, with a focus on the implications for water quality and quantity. The report provides recommendations for forest and water management in a changing climate. • Hold a Joint Steering Committee meeting to share knowledge from the report. Committee members include representatives from First Nations, forestry industry, DFO, Ontario Ministry of Natural Resources and Forestry, and academia. • Deliver knowledge exchange activities on the impacts of climate change on water quantity and quality with local and First Nation youth. This includes outdoor environmental education programs and activities that enhance the sharing of local Indigenous Knowledge.

2019-20	Q3-Q4 <ul style="list-style-type: none"> Continue the knowledge exchange with a focus on local and First Nation youth. Translate the knowledge gained from the TLW study into indicators to measure and track the cumulative effects of a warming climate, forest management, water quality and quantity, biodiversity and air pollution on a forested ecosystem.
	RESOURCES (Total estimate using existing resources)
	NRCan: TBD ECCC: TBD
	USERS
	<ul style="list-style-type: none"> Federal and provincial governments Forest industry and forest certification bodies First Nations and the Canadian public Environmental non-governmental organizations
	LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS <ul style="list-style-type: none"> Government of Canada: Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities.

	ACTIVITY 3.5 (Existing being amplified) Water sustainability metrics tools
	Water sustainability metrics and tools to inform adaptation and mitigation actions in the agricultural sector, for environmental conservation and land management decisions.

Science and Policy Questions are the same as for activity 3.1

DEPARTMENTS OR AGENCIES	
Lead: AAFC DG Ontario -Quebec Region, S&T Branch. Contributors: ECCC, StatCan.	
TIMELINE	
2017-18	Q4 <ul style="list-style-type: none"> Develop new estimates of water use by primary agriculture, e.g., cultivation, growing and harvesting of any agricultural or horticultural commodities. Identify risk of surface and ground water contamination from agriculture nutrients.

2018-19	Q3-Q4 <ul style="list-style-type: none"> Implement improved methods to produce updated annual water use and water contamination risk data. First stage focusses on doing this by agricultural commodity (e.g., corn, beef cattle). Develop approaches to identify watershed-level assessments of risk and impact by agriculture. Share relevant data on open.canada.ca and the FGP.
2019-20	Q3-Q4 <ul style="list-style-type: none"> Continue to implement approaches to identify water use and water contamination risk data annually and by agricultural commodity. Implement approaches to better assess watershed-level impacts, risk and vulnerability. Deliver new estimates of risk of water contamination with pesticides and coliforms by primary agriculture. Develop approaches to integrate risk of water contamination by agriculture into a single indicator. Create tools for users to interact with and visualize data and share data on open.canada.ca and the FGP.
2020-25	<ul style="list-style-type: none"> Implement approaches to integrate risk of water contamination by agriculture into a single indicator. Deliver metrics for enhanced accuracy and efficiency of reporting for improved targeting of environmental conservation activities. Deliver staggered release of reports that: <ul style="list-style-type: none"> Highlight how program development and decision-making are supported by common federal performance measures and sustainability indicators; and Identify critical source areas and integrated management practices to significantly reduce nitrogen and phosphorus loading to surface watercourses and groundwater. Continue to create tools for users to interact with and visualize data and share relevant data on open.canada.ca and the FGP.
RESOURCES (Total estimate using existing resources)	
AAFC: 6 FTE. ECCC: TBD StatCan: TBD	
USERS	
<ul style="list-style-type: none"> Policy makers Scientists Academia Federal and provincial governments Agriculture and agri-food sector 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	

- **AAFC:** Water Quality Compound Index is a combination of indicators for nitrogen, phosphorus, coliforms, and pesticides using trend data from 1981-2011.
- **AAFC and ECCC:** Memorandum of Understanding (MOU) to develop common approaches to science management processes and systems, share resources and opportunities to accelerate knowledge generation, and land-use planning to respond to climate change impacts and protect biodiversity, water and soil resources.
- **Government of Canada:** Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities.



ACTIVITY 3.6 (Existing being amplified)

Using Earth observation data for water monitoring

Enhance the reliability of the Canadian food supply in a changing climate by maximizing the use and potential of Earth observation technologies and building on the Leading Edge Environmental and Agricultural Forecast Network.

Science and Policy Questions are the same as for activity 3.1

DEPARTMENTS OR AGENCIES

Lead: AAFC DG Ontario -Quebec Region, S&T Branch.

Contributors: ECCC, Canadian Space Agency (CSA).

TIMELINE

Q4

2017-18

- Develop new methods and datasets to quantify surface water availability in order to improve weather forecasting, agricultural water resources assessments and agroecosystem modelling (e.g., developing surface wetness indices relevant to agricultural production and improving soil moisture data sets using assimilation of satellite Earth observation data).
- Increase availability of Earth observation data on soil moisture and freeze/thaw measurements from the Soil Moisture Active Passive and Soil Moisture and Ocean Salinity satellite missions in order to improve soil moisture measurements.
- Increase availability of radar data (RADARSAT-2) to help map the extent of water bodies, to monitor flooded areas, and to potentially improve soil moisture measurements.

2018-19	Q4 <ul style="list-style-type: none"> • Deliver enhanced surface and root zone soil moisture datasets and make available 30 historical precipitation and soil moisture datasets that cover all of North America. • Evaluate improvements from enhanced soil moisture and precipitation data sets for crop model predictions. • Develop indicators for quantifying inter-annual variability in moisture availability for crop production, and for improving production forecasts. • Continue making available radar data (RADARSAT Constellation Mission) to help map the extent of water bodies, to monitor flooded areas and to potentially improve soil moisture measurements.
2019-20	Q4 <ul style="list-style-type: none"> • Recommendations to develop shared data sets and infrastructure to conduct geospatial assessment and enhanced collaboration through the sharing and transfer of resources, modelling and Earth observation expertise. • Develop and implement the enabling information technology infrastructure required to achieve timely and coordinated responses to land-use management decisions and climate change impacts.
2020-25	<ul style="list-style-type: none"> • Continue enhancing national Earth observation-derived soil moisture monitoring capacity. • Provide high accuracy water surface elevation over lakes, rivers and wetlands using Surface Water and Ocean Topography (https://swot.jpl.nasa.gov/).
RESOURCES (Total estimate using existing resources)	
AAFC: 11 FTE and O&M TBD. ECCC: TBD CSA: TBD	
USERS	
<ul style="list-style-type: none"> • Universities • Federal and provincial ministries 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> • Government of Canada: Open Science commitments to increase public access to federal scientific data and publications and heighten engagement of Canadians with federal science and technology activities. • AAFC and ECCC: MOU to develop common approaches to science management processes and systems, share resources and opportunities to accelerate knowledge generation, and land-use planning to respond to climate change impacts and protect biodiversity, water and soil resources. • CSA: RADARSAT Constellation Mission; Surface Water and Ocean Topography; and Soil Moisture Ocean Salinity satellite missions. 	

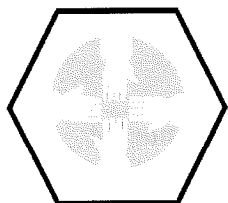
GOVERNANCE

- The PCF Assistant Deputy Ministers (ADM) Committee will provide oversight and strategic direction for all Action Plans under the *Federal Targeted Climate Change Science Plan*.
- At the activity level, existing governance structures will be used to strengthen science to policy linkages and collaboration with the science community working on IK, adaptation and economic research. For Activity 3.1, 3.2, and 3.4, progress will be reported to the Shadow Committee of the Federal Committee on Geomatics and Earth Observations. For Activity 3.3, progress will be reported ad-hoc depending on the hotspots identified. For Activity 3.5 and 3.6, progress will be reported through the existing Interdepartmental MOU between AAFC and ECCC.
- Lead DGs or Directors will be responsible for reporting critical activities' milestones at least once a year to the identified committees. When relevant, representatives from the Tri-Council, the three federal research granting agencies, will be invited.
- Lead and contributing departments are each responsible for aligning organizational resources with activities in order to achieve the intended results.
- The Action Plan will be evergreen. Flexibility will enable experimenting with models of delivery and addressing emerging policy needs.

ENGAGEMENT AND COMMUNICATION

- When necessary, additional targeted engagement will take place through the Interdepartmental Water Tiger Team and the Federal S&T Working Group that support the ADM S&T Integration Board.
- With non-federal partners and users, the communication of results and outputs will rely on existing mechanisms, including the FGP and the Adaptation Platform Buildings and Infrastructure and Agriculture working groups.

Annex 4 –Resilient Regions and Communities Action Plan



RESILIENT REGIONS AND COMMUNITIES ACTION PLAN

OUR CHALLENGE

Climate change is affecting how often extreme weather events happen, where they occur, how long they last and how intense they are⁶. Extreme weather events affect individuals, groups and sectors differently depending on their vulnerability, exposure to risk and capacity to be resilient. Further, “[i]nequalities influence local coping and adaptive capacity, and pose disaster risk management and adaptation challenges.”⁷ There are gaps in our ability to predict extreme conditions, provide mental health support and use natural infrastructure for mitigation and adaptation.

Drought is one of the most significant and expensive weather and climate-related risks for the agricultural sector. It also causes broad impacts on

RESULT

Canadian regions and communities are more resilient to climate change impacts, especially extreme events, through access to the latest knowledge to inform their planning and responses.

SCIENCE OUTCOMES

Increased understanding of climate change impacts, especially extreme events, on people, their environment, food security, economy, health and natural infrastructure. New techniques are developed to enable adaptation and mitigation actions through the consideration of Indigenous Knowledge, local knowledge and science.

POLICY OUTCOMES

Working in partnership with stakeholders, including Indigenous communities, tools and information are made available in order to prepare our infrastructure and communities for climate-related hazards and disaster risks such as floods, wildfires, droughts, and extreme weather events.

OUTPUTS

- Increased capacity to anticipate droughts and their impacts, in support of community resilience;
- Increased capacity to communicate with communities about extreme events and emergency response, drawing upon science, Indigenous and local knowledge in a meaningful way; and
- Increased knowledge of the role of urban forests as natural infrastructure in increasing the climate resilience of cities and promoting biodiversity.

⁶ Intergovernmental Panel on Climate Change, *Special Report, Managing the Risks of Extreme Events to Advance Climate Change Adaptation* (Summary for Policy Makers 3.1).

⁷ Intergovernmental Panel on Climate Change, *Special Report, Managing the Risks of Extreme Events to Advance Climate Change Adaptation* (5.5.1, 6.2).

human health and well-being by threatening food security and drinking water supplies, and by putting severe stress on ecosystems. Canada has an existing drought assessment system that provides national information on current drought conditions. The next challenge is to develop a forecasting capability that would predict future drought conditions in order to support adaptive response planning.

Following a disaster, the number of people with psychological trauma exceeds the number of people with physical injury by as much as 40 to 1⁸. While there has been much focus on the physical effects of a disaster, less attention has been paid to the psychosocial impacts. Knowledge is needed to understand how best to support the mental health and well-being of all Canadians during and after disasters, particularly for Indigenous communities where existing inequalities may impact resilience. Many Canadian coastal communities are particularly vulnerable to the impacts of climate change, sea-level rise, storms, flooding, and erosion. Future projections of climate change in the marine environment indicate that rising sea level and declining sea ice will cause changes in extreme water levels, which will impact Canada's coastlines and the infrastructure in these areas.

Cities can experience amplified impacts of extreme heat events through the “urban heat island” effect, which is a phenomenon where urban ambient temperatures are hotter than those of surrounding rural areas. Urban forests are natural infrastructure and they have a cooling effect while also supporting biodiversity, and improving air and water quality. Working with stakeholders will improve knowledge and provide practical information of how to protect and promote healthy urban forests.

WHAT WE ARE BUILDING ON

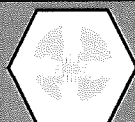
The federal government has a wide range of programs that support climate adaptation and resilience across different Canadian sectors and communities. Programs such as **Climate Change and Health Adaptation for First Nations and Inuit Communities** and **First Nation Adapt** support Indigenous communities. Other programs support agriculture, forestry, fisheries and oceans. The **federal granting agencies** play a key role in making connections between academic and federal researchers, and Canadian communities. The Canadian Institutes of Health Research (CIHR) and the Social Science and Humanities Research Council (SSHRC) support community-based research, sometimes in partnership with federal departments and agencies, to collaboratively develop adaptation knowledge and response capacity.

Research that focuses on how climate change impacts specific communities, regions and sectors can support their resilience and contribute to actions under the *Pan-Canadian Framework on Clean Growth and Climate Change* (PCF). The PCF aims to: reduce climate related hazards and disaster risks; build climate resilience through infrastructure; protect and improve human health and well-being; and support vulnerable regions. Furthermore, the establishment of the Canadian Centre for

⁸ Predicting community resilience and recovery after a disaster, posted on August 7, 2017 by Jon Links, Professor, Johns Hopkins Bloomberg School of Public Health

Climate Services (CCCS) will provide authoritative climate data, information and tools to support adaptation decision-making.

WHAT WE WILL DO



ACTIVITY 4.1 (Existing being amplified) Drought Forecasting Pilot


New capacity to forecast the probability of drought conditions on monthly and seasonal scales and communicate the information to stakeholders.

Science Question: Can an effective early warning forecast system for drought, including rapid onset drought, be developed with our current drought monitoring, weather and climate prediction capabilities?

Policy Question: How can science help communities and sectors plan adaptive responses by providing advance knowledge of risks and probabilities of drought occurrence on medium-range time-scales?

DEPARTMENTS OR AGENCIES	
Lead: Agriculture Agri-Food Canada (AAFC) Director General (DG) Ontario-Québec Region, Science and Technology Branch. Contributors: Environment and Climate Change Canada (ECCC) to be confirmed (TBC).	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> Scan and review current methodologies used by other countries (e.g., the United States, Mexico and Australia) to forecast drought. Analyze the current science, data and indices available for: <ul style="list-style-type: none"> Detecting and assessing the onset of drought; Forecasting and simulating future drought on short to long-term timescales, starting with monthly and seasonal (3 months).
2018-19	Q1-Q4 <ul style="list-style-type: none"> Develop and validate a functional model to generate drought scenarios and forecasts for Canada on monthly and seasonal time scales. Provide a test Canadian drought early-warning system product online (e.g., through the existing Drought Watch website) and solicit feedback from users.
RESOURCES (Total estimate using existing resources)	
AAFC: 1 Full time equivalent (FTE) and \$30K Operations and Maintenance (O&M). ECCC: To be determined (TBD).	
USERS	
<ul style="list-style-type: none"> Various sectors including agriculture/agribusiness, forestry, health, parks and recreation 	

<ul style="list-style-type: none"> • Water managers • Provincial government agencies • Federal researchers and decision-makers • Media
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
<ul style="list-style-type: none"> • AAFC: Expertise and mandate to undertake drought monitoring for Canada. • ECCC: Research and development activities using the Canada Land Data Assimilation System, precipitation re-analysis and weather and climate prediction at different timescales. • Government of Canada CCCS: Support adaptation decision-making by producing data and scenario products, and developing and disseminating climate information.


	ACTIVITY 4.2 (Existing being amplified) Addressing Mental Health Impacts of Extreme Weather Events in Indigenous Communities
Identification of knowledge and program delivery gaps and solutions co-developed with Indigenous communities.	

Science Question: What is the capacity of the emergency response community in Canada to address the mental health impacts of extreme events on Indigenous Peoples, in the face of climate change?

Policy Question: What are the impacts of extreme events on mental health and well-being in Indigenous communities and how can they best be mitigated?

DEPARTMENTS OR AGENCIES	
Lead: Health Canada (HC) Director Environmental Public Health, First Nations and Inuit Health Branch. Contributors: Indigenous and Northern Affairs Canada (INAC), Public Health Agency Canada (PHAC), Natural Resources Canada (NRCan), CIHR.	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> • Conduct a literature review and synthesis of existing research related to the mental health impacts of extreme weather events, focusing on research relevant to Canada. • Facilitate connections between interested federal organizations with relevant mental health-related policy or science questions, and researchers funded under CIHR's Health Effects of the Alberta Wildfires initiative.
2018-19	Q1-Q4 <ul style="list-style-type: none"> • Convene a discussion amongst key inter-jurisdictional actors (including non-governmental organizations) of mental health and emergency management in the context of extreme weather events.

2019-2020	<p>Q4</p> <ul style="list-style-type: none"> Support communities in assessing their own vulnerabilities, capacities and resiliency. Connect communities with the appropriate programs in order to address their own vulnerabilities, increase community capacity and promote community resiliency.
RESOURCES (Total estimate using existing resources)	
HC: 1 student and \$10K O&M	
USERS	
<ul style="list-style-type: none"> Indigenous communities Emergency response organizations Health care authorities Policy community within Indigenous organizations, federal and provincial, territorial governments 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> HC: Climate Change and Health Adaptation Program for First Nations and Inuit Communities. INAC: First Nations Adapt Program. NRCan with SSHRC: Work related to the First Nations Wildfire Evacuation partnership, which involves 12 agencies (including the NRCan's Canadian Forest Service) and 8 Indigenous communities to jointly conduct research to improve evacuations of Indigenous communities. NRCan with CIHR-funded researcher: Work to examine the impacts of wildfires on the health and well-being of Indigenous Peoples and communities in the Regional Municipality of Wood Buffalo, in collaboration with experts from the University of Alberta. 	

	<p>ACTIVITY 4.3 (Existing being amplified)</p> <p>Urban Forest Pilot Projects to Enhance Climate Change Mitigation and Adaptation</p>
<p>Collaborative pilot projects with federal partners and external stakeholders resulting in best practices and decision-support tools for urban forests as natural infrastructure for mitigation and adaptation.</p>	

Science Question: What are the knowledge gaps regarding urban forest science??

Policy Questions: What role can urban forests play in making cities more climate resilient?
How can urban forests be used to provide climate change mitigation and air quality co-benefits?

DEPARTMENTS OR AGENCIES
Lead: NRCan DG Science Policy Integration, Canadian Forest Service.

Contributors: HC.	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> Explore opportunities to collaborate amongst departments and agencies on science and research related to natural infrastructure in urban areas and develop a federal community of practice. Establish collaborations with other federal departments, to develop pilot project proposals related to urban forests, with engagement from stakeholders. Pilot projects could address topics such as the reduction of urban heat islands, urban tree surveys, human health impacts (e.g., informed species choices for urban settings such as low allergenic tree species), biodiversity (e.g., aiding biodiversity using urban forests as wildlife corridors) and climate change.
2018-20	Q1-Q4 <ul style="list-style-type: none"> Establish pilot projects on urban forests in collaboration with stakeholders. Document best practices and tools for decision support in relation to urban forestry and climate change mitigation and adaptation.
RESOURCES (Total estimate using existing resources)	
NRCan: 1.5 FTE HC: TBD	
USERS	
<ul style="list-style-type: none"> Municipalities Conservation authorities Federal and provincial policy and regulatory communities Non-governmental organizations 	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> NRCan: Ongoing climate change adaptation initiatives. HC: Ongoing climate change adaptation initiatives. 	

GOVERNANCE

- The PCF Assistant Deputy Ministers (ADM) Committee will provide oversight and strategic direction, on a bi-annual basis, for all Action Plans under the *Federal Targeted Climate Change Science Plan*.
- At the activity level, existing governance structures will be used to strengthen science to policy linkages and collaboration with the science community working on extreme events, IK, adaptation and health research. Existing governance structures will be used to strengthen science to policy linkages and collaboration with the science communication community. For Activity 4.1, progress will be reported through the existing Memorandum of

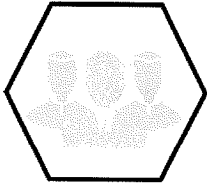
Draft For Discussion

Understanding between AAFC and ECCC (to be confirmed). For Activity 4.2 and 4.3, progress will be reported to TBD.

- Lead DGs or Directors will be responsible for reporting critical activities' milestones at least once a year to the identified committees. When relevant, representatives from the Tri-Council, the three federal research granting agencies, will be invited.
- Lead and contributing departments are each responsible for aligning organizational resources with activities in order to achieve the intended results.
- The Action Plan will be evergreen. Flexibility will enable experimenting with models of delivery and addressing emerging policy needs.

ENGAGEMENT AND COMMUNICATION

- When necessary, additional targeted engagement will take place through the Adaptation Platform and relevant working groups.



OUR CHALLENGE

The inclusion of Indigenous Knowledge (IK) alongside scientific research can provide a foundation for successful, cost-effective and culturally-appropriate adaptation strategies.⁹ To be able to include IK, such as Inuit Knowledge (Inuit Qaujimajatuqangit [Inuktitut syllabics: ᐃᑭᐅᐱᔪᕐᓂᐱᑦ], in Canada's regional and national climate assessments and in the *Intergovernmental Panel on Climate Change* (IPCC) assessment processes, IK must be meaningfully and inclusively mobilized¹⁰, and an enhanced dialogue and partnership between Indigenous Peoples and their knowledge-holders, local communities, academics and policy makers facilitated.

There is still a limited understanding of how and why Canadians make adaptation and

RESULT

Enhanced climate resilience by empowering Canadians, communities, businesses and governments to make informed adaptation and mitigation decisions using insights from the social sciences, Indigenous and local Knowledge, and humanities.

SCIENCE
OUTCOME

Increased understanding of the enabling factors and constraints for adaptation and mitigation responses from a social, economic, cultural and behavioural perspective.

POLICY
OUTCOME

Working in full partnership with Indigenous Peoples, evidence is developed to help design and implement effective and culturally appropriate climate policies and programs.

OUTPUT

- Synthesized and accessible evidence on how to meaningfully, inclusively and equitably work with communities to share and apply Indigenous and local Knowledge in support of climate action.
- Insight into why and how governments, communities, and indigenous peoples make decisions and act on them to inform climate change adaptation and mitigation actions. Widely disseminated, modern and enhanced economic and energy models to inform climate policy and project greenhouse gas (GHG) emissions.

⁹ Draft State of Knowledge and Gap Analysis on Climate Change Adaptation in Nunavik. 2017. Report submitted to Indigenous and Northern Affairs Canada (INAC) by Ouranos.

¹⁰ Inuit Priorities for Canada's Climate Strategy. 2016. Inuit Tapiriit Kanatami.

mitigation decisions and act on them. A recent review on economic instruments available to support adaptation in Canada found that simply providing information on risk and adaptation benefits, or offering incentives for adaptation may lead to ineffective policies unless behavioural insights are considered.¹¹ Insights into how and why people and organizations make decisions will inform decision-makers about how to: communicate climate science more effectively; provide targeted support to affected communities; articulate the moral and ethical positions as well as the economic rationales for actions; and influence individual and collective behavior.¹² Alongside behavioural insights, research on the interactions between the energy system, economy, environment and climate policies is needed to communicate to Canadians the regional and national economic impacts of climate measures and policies. Enhanced economic modelling and analytical capacity will provide the foundation for accessible products helping Canadians understand how climate policies are expected to affect them.

WHAT WE ARE BUILDING ON

The federal government has been working to mobilize social sciences and Indigenous and local Knowledge to help shape environmental policies and actions. This includes: supporting the **Economics and Environmental Policy Research Network (EEPRN)** to fund and disseminate cutting edge research on economics and environmental policy priorities; leading the multi-jurisdictional **Value of Nature to Canadians Study** to identify the social, cultural and economic values of biodiversity and ecosystem services to Canada; and supporting research through **Canada's federal granting agencies** on the cultural, social and economic experiences of Indigenous Peoples, as well as their health and well-being.

The *Pan-Canadian Framework on Clean Growth and Climate Change* (PCF) recognizes Indigenous Peoples climate leadership, and reiterates the federal government's commitment to a renewed nation-to-nation, government-to-government, and Inuit-Crown relationship with Indigenous Peoples. This includes supporting meaningful engagement with Indigenous Peoples to respectfully work with IK holders in order to help guide climate change decision-making with new funding for initiatives such as: the **Indigenous Guardians Program** to facilitate partnership with Indigenous communities in monitoring ecological health, maintaining cultural sites and protecting sensitive areas and species; and investments to integrate IK to enhance resilience in northern communities by improving the design and construction of northern infrastructure.

WHAT WE WILL DO



ACTIVITY 5.1 (New collaboration)

Guidance on the Inclusion of IK to Support Climate Action

Synthesis report on best practices and guidance to include IK meaningfully, inclusively and

¹¹ Draft State of Play Report 2017 Economics Working Group Adaptation Platform.

¹² Allison and Basset (2015) Science 350 (6262), 778-782.

equitably in science assessments and climate change actions.

Science Questions: What role can culture, beliefs, Indigenous and local Knowledge play in enabling climate change action in Canada?
How can IK and Indigenous perspectives be meaningfully, inclusively and equitably included and protected in a culturally appropriate and respectful manner in science assessments informing climate change policies?

Policy Questions: How can a plurality of knowledge systems, values and viewpoints be included in the development of more effective and culturally appropriate climate policies?
What constitutes meaningful recognition and engagement with knowledge holders?

DEPARTMENTS OR AGENCIES


Leads: Environment and Climate Change Canada (ECCC) Director General (DG) Wildlife and Landscape Science and DG Science and Technology Strategies, Science and Technology (S&T) Branch.

Contributors: Indigenous and Northern Affairs Canada (INAC), Natural Resources Canada (NRCan), Public Health Agency Canada (PHAC), Social Sciences and Humanities Research Council (SSHRC).

TIMELINE

2017-18	<p>Q3-Q4</p> <ul style="list-style-type: none"> Co-definition with Indigenous representatives of the objective and scope of work using PCF Joint Tables with First Nations, Inuit, and the Métis Nation. Establishment of a Memorandum of Understanding (MOU) between ECCC and SSHRC to fund projects by and/or with Indigenous Peoples through SSHRC's granting programs. Launch of the initiative and call for proposals. First report completed: Draft guidance document on including IK in the Government of Canada next national climate change assessment, <i>Canada in a Changing Climate: Advancing our Knowledge for Action</i> developed by the subcommittee of the Assessment Advisory Committee (includes representatives from the NIOs).
2018-19	<p>Q1</p> <ul style="list-style-type: none"> Start date of SSHRC awards and payments. <p>Q3-Q4</p> <ul style="list-style-type: none"> Workshop or other similar activity developed in partnership with First Nations, Inuit, and the Métis Nation to inform the joint development of specific guidelines for accessing and incorporating IK systems. Participants include Indigenous Peoples representatives as well as members from Canada's national climate change Assessment Advisory Committee, representatives from SSHRC funded projects and international experts. Second report completed: Workshop report, including preliminary recommendations for national and other science assessments.

2019-20	<p>Q1-Q2</p> <ul style="list-style-type: none"> • Third report completed: Synthesis report on best practices and guidance to include IK meaningfully, inclusively and equitably in science assessments and climate change actions. • Peer reviewed papers to disseminate results to the scientific and practitioner community. • Dissemination activities through existing mechanisms, e.g., SSHRC network, Adaptation Platform and IPCC government focal points network.
<p>RESOURCES (Total estimate using existing resources)</p>	
<p>ECCC: Full time equivalent (FTE) to be determined (TBD). Operations and Maintenance (O&M) \$100K for workshop and \$50K for research funding. SSHRC: For meritorious research proposals, co-funding with ECCC (up to \$50K) through <i>Connection</i> grants. NRCan: 1 FTE and \$5K O&M.</p>	
<p>USERS</p>	
<ul style="list-style-type: none"> • Indigenous organizations; Indigenous peoples; federal, provincial and territorial governments (e.g., regulators) • Scientists, e.g., encouraging further research in partnership with Indigenous Peoples 	
<p>LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS</p>	
<ul style="list-style-type: none"> • INAC: Climate Change Preparedness in the North, First Nation Adapt and Indigenous Community-Based Climate Monitoring integrate IK with climate change science and support Indigenous collaboration on climate change. • Health Canada (HC): Climate Change and Health Adaptation for First Nations and Inuit Communities. • ECCC: Diverse partnerships with Indigenous communities in environmental monitoring initiatives (e.g., monitoring and research related to Arctic marine birds). • Government of Canada: National and sectoral science assessments within climate science and adaptation programs in multiple departments, including ECCC, HC, NRCan and INAC. 	



ACTIVITY 5. 2 (New collaboration)

Behavioural Design Pilots on Adaptation and Mitigation Measures

Pilots to test how individual, organizational, economic and social behaviours affect awareness, acceptance and adoption of adaptation and mitigation measures.

Science Questions: How do people and organizations make adaptation and mitigation decisions and act on them?

 How can insights into individual, organizational, social and economic behaviours be taken into account in the design of climate change policies and the implementation and the evaluation of climate change programs?

Policy Question: How can we foster individual and collective behaviour leading to adaptation and mitigation actions?

DEPARTMENTS OR AGENCIES	
Leads: ECCC DG Science and Technology Strategies, S&T Branch and SSHRC Executive Director, Research Grants & Partnerships. Contributors: PHAC and Privy Council Office (PCO) Innovation Hub.	
TIMELINE	
2017-18	Q3-Q4 <ul style="list-style-type: none"> Validate the scope and objective of the pilot projects focusing on 1) climate change science communication. Establishment of innovative financing or a MOU between ECCC and SSHRC to share the cost of projects. Projects should include the use of randomized controlled trials and related evidence-based methods to assess the impact of pilot projects on specific outcomes defined in collaboration with relevant stakeholders.
2018-19	Q1-Q2 <ul style="list-style-type: none"> Start date of award and payments. Staggered release of reports highlighting best practices for decision support in relation to science communication and incentives to enhance urban conservation efforts and increase green infrastructure.
2019-20	Q3-Q4 <ul style="list-style-type: none"> Staggered release of reports continues. Dissemination activities through existing mechanism, e.g., SSHRC network, EEPRN.
RESOURCES (Total estimate using existing resources)	
ECCC: FTE TBD and \$50K O&M. SSHRC: For meritorious research proposals, co-funding with ECCC (up to \$50K) through <i>Partnership Engagement</i> grants.	
USERS	
Policy community, science communicators and scientists within the federal government.	
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS	
<ul style="list-style-type: none"> ECCC: Multi-jurisdictional initiative <i>Value of Nature to Canadians Study</i>. The study's purpose is to identify the social, cultural and economic values of biodiversity and ecosystem services to Canada, to support government policy and decision-making and public awareness initiatives. Behavioral economic research exploring the effects of psychological, social, cognitive and emotional factors in economic decision-making by individuals and institutions and ongoing engagement with academia with funding to the EEPRN. ECCC with PCO Innovation Hub: Ongoing work to understand the behavioural barriers to the use of non-leaded hunting and fishing equipment and to drive the use of environment-friendly alternatives. 	



ACTIVITY 5.3 (Existing being amplified) Enhanced Economic Modelling

Development, enhancement and analytical application of economic modelling frameworks that inform climate policy and emission projections.

Science Question: How do consumer behaviours, technological innovation, macroeconomic factors, climate policies, carbon pricing and GHG projections interact?

Policy Questions: How are climate policies expected to affect the Canadian economy?
How are climate policies expected to reduce GHG emissions?

DEPARTMENTS OR AGENCIES	
Lead: ECCC DG Economic Analysis Directorate, Strategic Policy Branch. Contributors: TBD.	
TIMELINE	
2017-18	Q4 <ul style="list-style-type: none"> Modernization of the macroeconomic model.
2018-19	Q4 <ul style="list-style-type: none"> Development of an integrated energy emission model for North America (Energy 2020).
Ongoing (2017-2025)	<ul style="list-style-type: none"> Enhancement of the integrated assessment model. Enhancement of computable general equilibrium models capable of global and region-specific analysis. Tracking scientific evolution of the social cost of carbon modelling and adjusting the Canadian approach as appropriate. Dissemination of results and analysis, as appropriate, including through federal peer networks, publications and participation in research consortia such as: Analysis of producer and consumer trends in response to government regulation programs and pricing policies; Publication of peer-reviewed reports on economic analysis in relation to GHG market activity; Publication of annual integrated energy emissions and economic projections to 2050 and beyond; Participation in international peer review consortia (Stanford University's Energy Modelling Forum and Integrated Assessment Modelling Forum); and Serve as a peer reviewer for National Communications and Biennial Reports being submitted by other Parties to the United Nations Framework Convention on Climate Change.
RESOURCES (Total estimate using existing resources)	
ECCC: TBD	

USERS
Policy and regulatory communities
LINK WITH EXISTING FEDERAL INITIATIVES AND PROGRAMS
Government of Canada: Economic analysis activities under the Clean Air Regulatory Agenda.

GOVERNANCE

- The PCF Assistant Deputy Ministers (ADM) Committee will provide oversight and strategic direction for all Action Plans under the *Federal Targeted Climate Change Science Plan*.
- At the activity level, existing federal governance structures and Indigenous governance structures, which includes community-level structures, will be used to strengthen science to policy linkages and collaboration with scientists and IK and local knowledge holders to advance work on IK, adaptation and economic research. For Activity 5.1, progress will be reported to PCF Joint Tables with NIOs and DG Coordinating Committee on the Arctic. For Activity 5.2, progress will be reported to the DG Adaptation and Resilience Committee. For Activity 5.3, progress will be reported through internal ECCC governance.
- Lead DGs or Directors will be responsible for reporting critical activities' milestones at least once a year to the identified committees. When relevant, representatives from the Tri-Council, the three federal research granting agencies, will be invited.
- Lead and contributing departments are each responsible for aligning organizational resources with activities in order to achieve the intended results.
- The Action Plan will be evergreen. Flexibility will enable experimenting with models of delivery and addressing emerging policy needs.

ENGAGEMENT AND COMMUNICATION

- When necessary, additional targeted engagement with First Nations, Inuit, and Métis (including knowledge holders) and other stakeholders outside the federal government will take place through PCF Joint Tables with NIOs, the Adaptation Platform (Plenary and Economics Working Group) and SSHRC's network.

Annex 6 – Examples of Climate Change Initiatives Funded Under Budgets 2016 and 2017

Department / Agency	Initiative
AAFC	<ul style="list-style-type: none"> Agricultural Discovery Science and Innovation (focus on emerging priorities <i>e.g.</i> climate change and soil and water conservation)
CIHR	<ul style="list-style-type: none"> Climate Change and Health Research Initiative
DFO	<ul style="list-style-type: none"> Aquatic Climate Change Adaptation Services
ECCC	<ul style="list-style-type: none"> Canadian Centre for Climate Services Legislative Framework for Offshore Renewable Energy Projects Short-Lived Climate Pollutants Transportation System De-carbonization
HC	<ul style="list-style-type: none"> Climate Change and Health Adaptation Program for Northern First Nations and Inuit Communities Heat Alert and Response Systems National Action Plan – Climate Change Health Risks
INAC	<ul style="list-style-type: none"> Climate Change Preparedness in the North First Nation Adapt Integrate Traditional Indigenous Knowledge into Climate Change Science and Measures Support Indigenous Collaboration on Climate Change
NRCan	<ul style="list-style-type: none"> Building Resilience in Canada's Natural Resource Sectors and Communities Building Regional Adaptation Capacity and Expertise (BRACE) Legislative Framework for Offshore Renewable Energy Projects Short-Lived Climate Pollutants Transportation System De-carbonization
NRC	<ul style="list-style-type: none"> Climate-Resilient Building and Infrastructure Codes and Guides
PHAC	<ul style="list-style-type: none"> Infectious Disease and Climate Change Program National Action Plan – Climate Change Health Risks
SCC	<ul style="list-style-type: none"> Standards to Support Resilience in Infrastructure
TC	<ul style="list-style-type: none"> Climate Change Resilience and Adaption of Transportation Infrastructure Northern Transportation Adaptation Initiative
Clean Technology	
NRCan / TC	<ul style="list-style-type: none"> Clean Energy and Transportation Research and Development
NRCan / AAFC / DFO	<ul style="list-style-type: none"> Clean Technology Research for Natural Resources Sectors
GAC	<ul style="list-style-type: none"> Clean Technology Strategy for International Business Development
NRCan / ISED	<ul style="list-style-type: none"> Clean Technology Data Strategy
ISED / NRCan	<ul style="list-style-type: none"> Clean Growth Hub

Annex 7 – 2016 Inventory of Federal Climate Change Science Activities by PCF Actions Area

Figures 7.1, 7.2 and 7.3 show the alignment of existing federal climate change science activities with PCF action areas. Nine departments and agencies (AAFC, CSA, DFO, ECCC, Parks, TC, HC, NRCan, NRC) were surveyed in 2016 on their climate change science activities (both natural and social sciences). Respondents were asked to categorize activities under different priority areas (e.g., Building resilience through infrastructure, Government Leadership). Note that some PCF action areas such as International Leadership are not represented here because departments were not asked to report on them at the time.

Figure 7.1: Mitigation Actions to Reduce Emissions

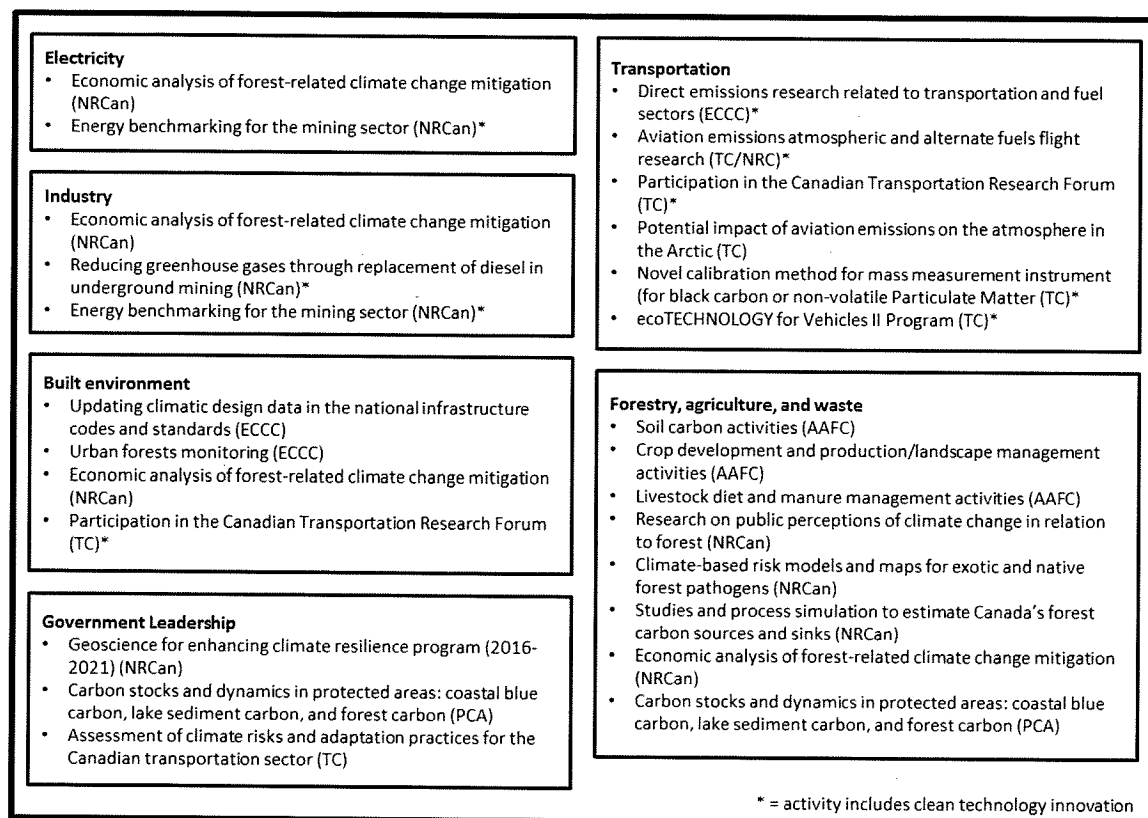


Figure 7.2: Fundamental & Cross-Cutting Science Activities for Mitigation and Adaptation

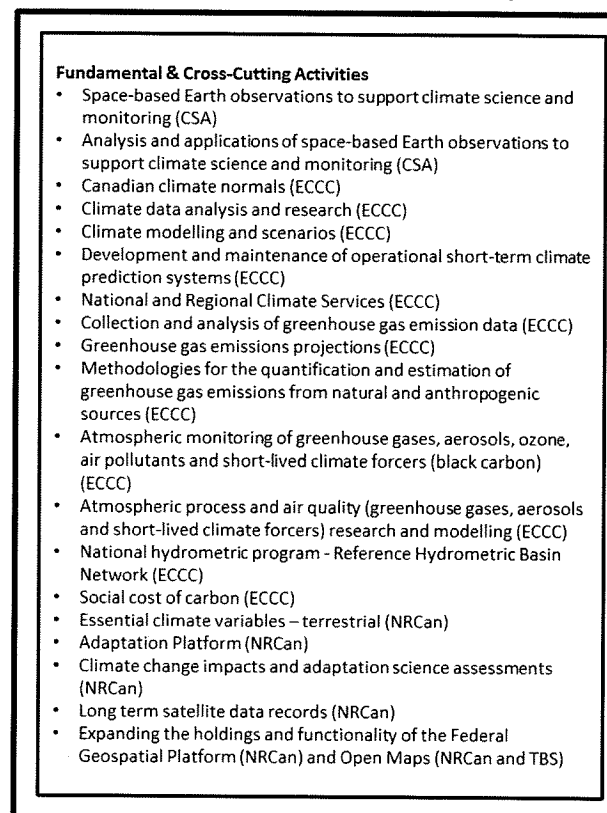
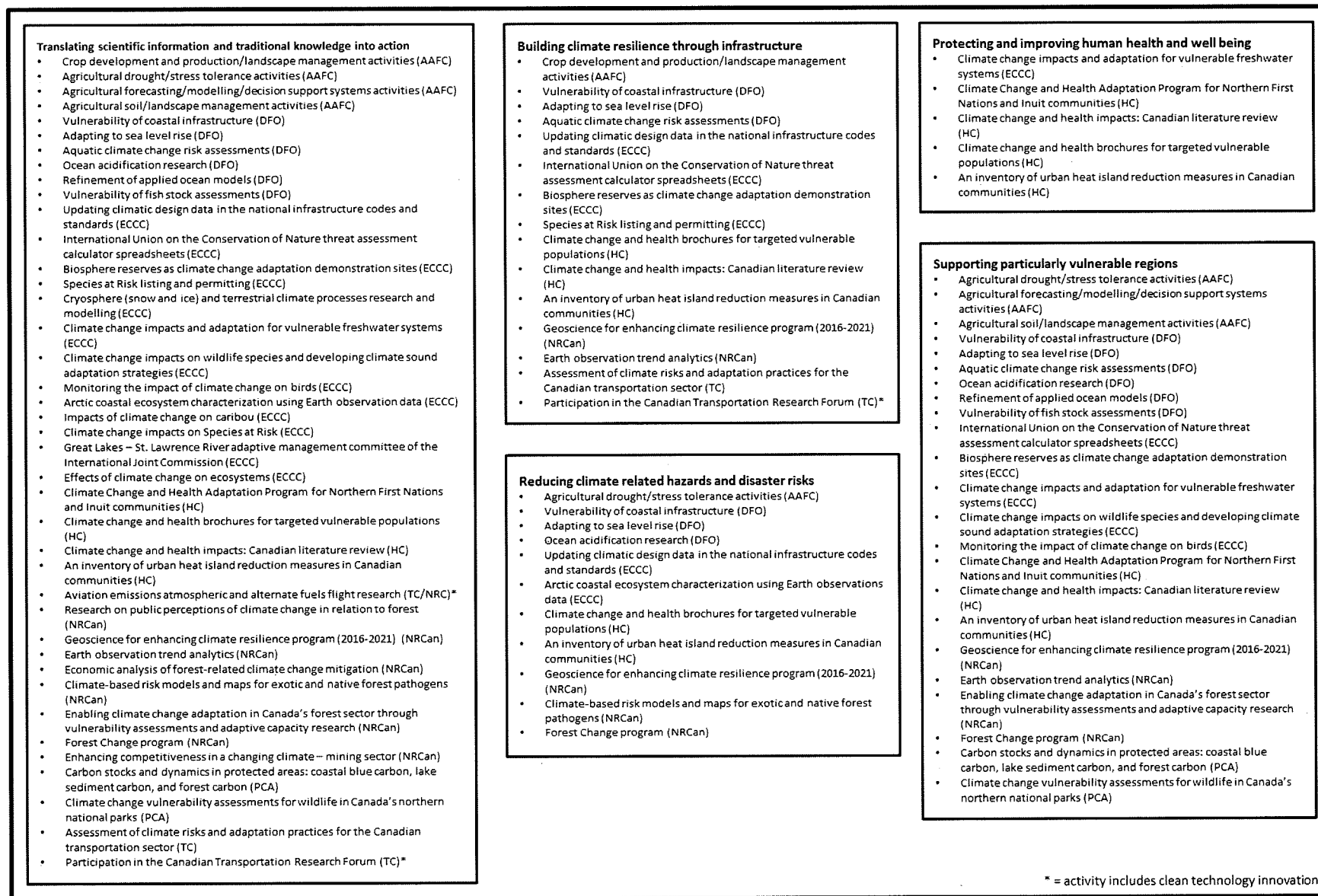


Figure 7.3: Adaptation and Climate Resilience Actions to Reduce Emissions



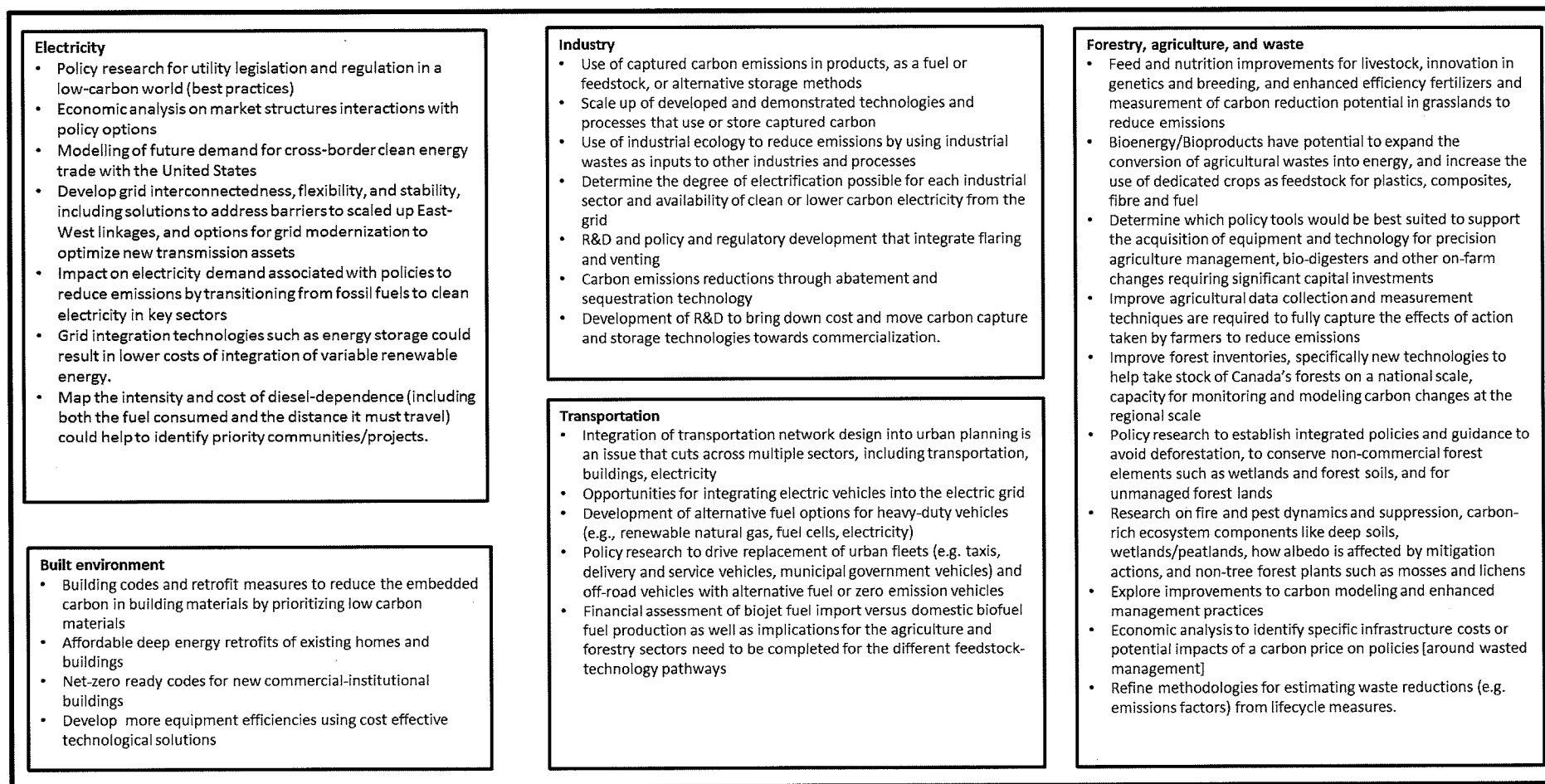
Annex 8 – Research Grants and Funding for Post-Secondary Institutions

The Government of Canada supports climate scientists and researchers in the academic sector through grants and funding offered by the three federal funding agencies (Social Sciences and Humanities Research Council, Natural Sciences and Engineering Research Council and the Canadian Institutes of Health Research) and the Canada Foundation for Innovation. The list below includes both broad and targeted programs that provide funding for climate research.

- John R. Evans Leaders Fund (CFI)
- Innovation Fund (CFI)
- College-Industry Innovation Fund (CFI)
- Major Science Initiatives Fund (CFI)
- Cyberinfrastructure Initiative (CFI)
- Exceptional Opportunities Fund (CFI)
- Canada Research Chairs (CIHR, NSERC, SSHRC)
- Canada Excellence Research Chairs (CIHR, NSERC, SSHRC)
- Canada First Research Excellence Fund (e.g., Sentinel North) (CIHR, NSERC, SSHRC)
- Networks of Centres of Excellence (e.g., ArcticNet) (CIHR, NSERC, SSHRC)
- International Research Initiative on Adaptation to Climate Change (CIHR, IDRC, NSERC, SSHRC)
- Applied Public Health Chairs program (CIHR, PHAC)
- Foundation Grant Program (CIHR)
- Support for the Inuit Traditional Knowledge for Adapting to the Health Effects of Climate Change project (CIHR)
- Environments and Health Signature Initiative (e.g., Lyme disease research network) (CIHR)
- Support for the Canadian Hub of Future Earth (CIHR)
- Discovery Grants (NSERC)
- Northern Research Supplements (NSERC)
- Ship Time (NSERC)
- Discovery Frontiers (NSERC)
- Strategic Partnership Project and Network Grants (NSERC)
- Collaborative Research and Training Experience (NSERC)
- Connect Grants (NSERC)
- Engage Grants (NSERC)
- Collaborative Research and Development Grants (NSERC)
- Industrial Research Chairs (NSERC)
- Belmont Forum (NSERC, SSHRC)
- Insight Development Grants (SSHRC)
- Insight Grants (SSHRC)
- Partnership Development Grants (SSHRC)
- Partnership Grants (SSHRC)
- Partnership Engage Grants (SSHRC)
- Connection Grants (SSHRC)

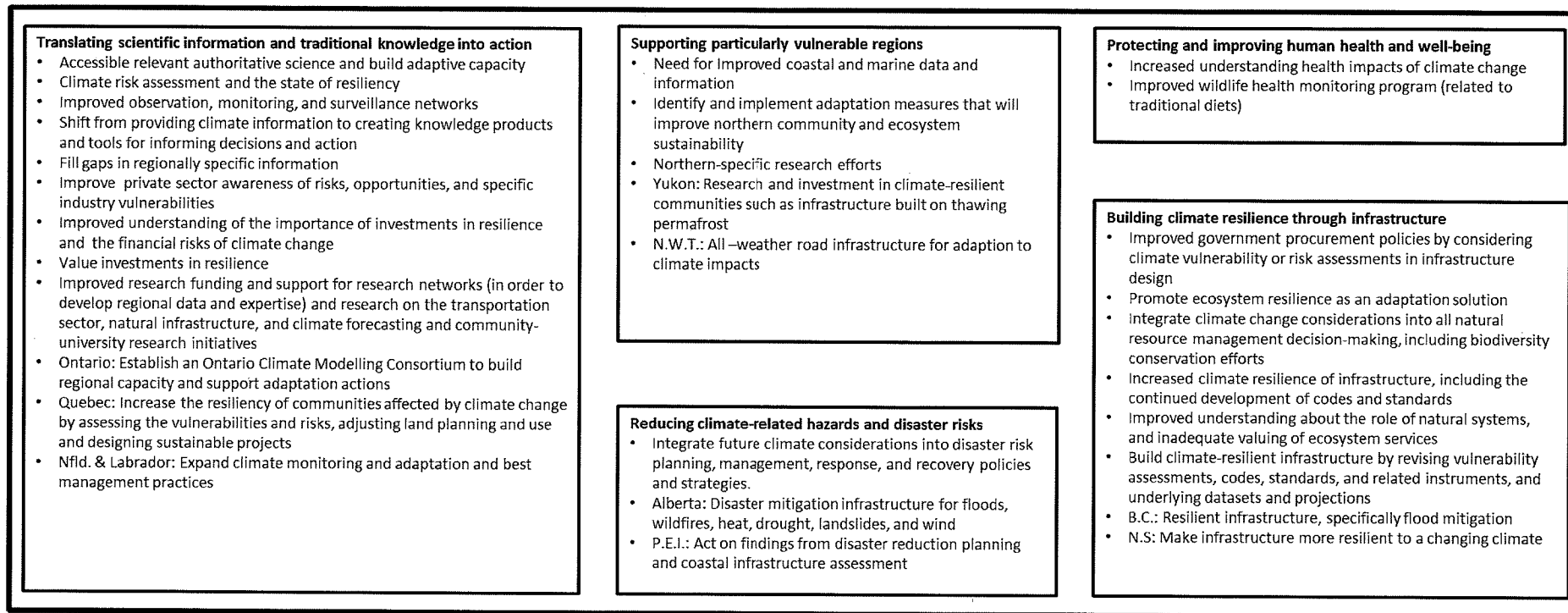
Annex 9 – Science Needs in PCF Working Group Papers¹³

Figure 9.1: Mitigation Research Needs to Reduce Emissions



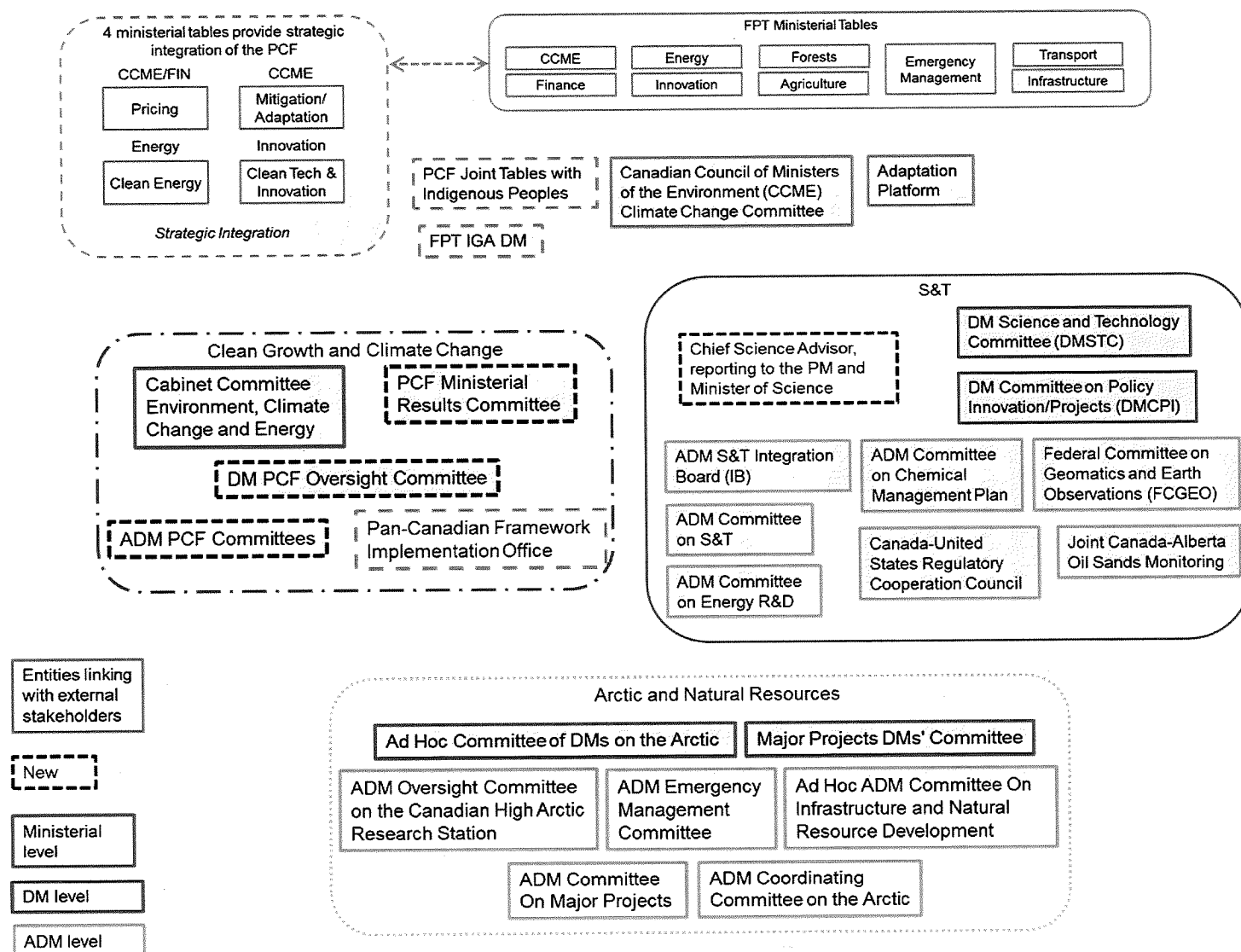
¹³ Working Group on Specific Mitigation Opportunities Report, Working Group on Adaptation and Climate Resilience Report

Figure 9.2: Adaptation and Climate Resilience Research Needs to Reduce Emissions



Annex 10 – Selected Governance Mechanisms for the Pan-Canadian Framework on Clean Growth and Climate Change and Federal Climate Change Science Activities

Climate change science is a complex, crosscutting issue, where many federal entities manage related programs and activities. Intramural governance mechanisms exist around PCF implementation (red circle), coordination of S&T activities (blue circle) and coordination of Arctic Science and science related to natural resources development (orange circle). Operationalizing the science activities identified in this Plan may rely on existing governance, with regular reporting to the PCF governance.



Annex 11 – Federal Clean Growth and Climate Change Governance

The Deputy Minister Oversight Committee (DMOC) on the PCF provides strategic oversight of, and direction on, the implementation of federal aspects of the PCF, including adaptation and climate resilience. It is co-chaired by the Deputy Clerk of the PCO and the Deputy Minister of ECCC, and includes Deputy Ministers from INFC, INAC, NRCan, TC, ISSED, AAFC, Finance, the Secretary of TBS, and the Deputy Secretary to the Cabinet (Operations) of the Privy Council Office. Deputy Heads from other relevant departments (e.g. HC, PHAC, DFO, NRC, SCC, PS) will be invited to participate for relevant discussions. This committee meets every four weeks.

Assistant Deputy Ministers' Committee (ADMC) on the PCF supports the DM Committee. It is co-chaired by PCO and ECCC and includes ADMs from GAC, AAFC, INFC, ISSED, TBS, NRCan, TC, Finance, INAC, DFO, HC, and PS. This committee meets every four weeks.

Director General Adaptation and Resilience Committee (DGARC), co-chaired by ECCC and NRCan. It will continue to coordinate federal adaptation efforts, but its mandate will be expanded to focus on implementation of the adaptation and climate resilience elements of the PCF. This committee currently includes DG representation from AAFC, CFIA, CIHR, DFO, GAC, HC, INAC, INFC, ISSED, NRC, PC, PHAC, PS, SCC, TC, and TBS. Membership will be expanded to include PCO and Finance Canada.

Director General Results Committee (DGRC) will provide support regarding formal results and reporting on climate action (e.g., Results and Delivery Charter for Effective Action on Climate Change).

International Experience:

Other countries have put in place strong governance structures to support evidence-based decision-making on climate change. These range from a federal coordination body in the U.S. (U.S. Global Change Research Program - USGCRP); an independent, statutory body in the U.K. charged with proposing carbon budgets, reporting on progress towards emission reduction targets and advising on climate change policies (the Committee on Climate Change (CCC)); to a federal department leading the development of a climate change science plan in Australia (Department of Energy and the Environment). The Australian plan provides both funding and research agencies with a single statement to guide investment decisions and ensure that the maximum national benefit is delivered to the Australian community.

The U.S. National Academies of Science report *Advancing the Science of Climate Change* (2010) recommended a single federal interagency program or other entity be given the authority and resources to coordinate and implement an integrated effort that supports improving both understanding of as well as responses to climate change. The report also recommended that the federal climate change research program should be formally linked with action-oriented programs focused on limiting the level of future climate change, adapting to climate change impacts, and informing climate-related actions and decisions, partnering locally and internationally.

**Page(s) 191 to 207
are withheld/excluded
pursuant to paragraphs
21(1)(a), 21(1)(b), 21(1)(d), 69(1)(g)re(a) and
69(1)(g)re(c)
of the *Access to Information Act***

**La/les page(s) 191 à 2017
Font l'objet d'une exception totale
conformément aux dispositions de paragraphe
21(1)(a), 21(1)(b), 21(1)(d), 69(1)(g)re(a) et
69(1)(g)re(c)
de la *loi sur l'accès à l'information***

November 2017

PCF Milestones and Events- DRAFT (for input and comment)

PROTECTED B

PCF Component	November 2017	December 2017	January 2018	Rest of 2018
Carbon Pricing	<p>Establish process for competitiveness review for carbon pricing</p>	<p>Carbon Pricing OBPS Regulatory Framework</p>		<p>Launch competitiveness review for carbon pricing</p> <p>Introduce Carbon pricing legislation</p> <p>Consultations on OBPS regulations</p>
Mitigation	<p>Publish proposed regulatory framework for the Clean Fuel Standard</p> <p>Final regs in CGI: HFCs (Nov 20-24)</p>	<p>Draft regs in CGI: coal, and natural gas</p> <p>Clean Fuel Standard Regulatory Framework</p> <p>Launch call for proposals for Green Infrastructure Phase II programs: (1) Smart Grids; (2) Clean Energy for Rural and Remote Communities; (3) Electric Vehicle and Alternative Fuel Infrastructure (Phase 2); (4) Energy Efficient Buildings; (5) Emerging Renewable Power</p> <p>National Trade Corridors Fund: First Call for Proposals (Jul 2017-Early 2018)</p> <p>Canadian Agricultural Partnership (Aug 2017-Mar 2018)</p> <p>Multi-Stakeholder consultations on diesel engines</p>	<p>Confirm national online platform for labelling and disclosure, as per PT feedback</p>	<p>Canadian Agricultural Partnership launched (Apr 1, 2018)</p> <p>Amendment 14 to the Energy Efficiency Regulations pre-published</p> <p>FPT Roadmaps to implement market transformation strategies for energy-using equipment are published (Aug 2018)</p> <p>Final regs in CGI: coal, methane, natural gas</p> <p>Discussion paper: off-road transportation</p>
Adaptation	<p>Launch of PCF adaptation initiatives</p> <p>Consult key stakeholders on national climate change and health data needs and priorities towards establishment of national monitoring</p>			
Clean Tech	<p>National ZEV Strategy: FPT Steering Group to develop options for Ministers</p> <p>Launch call for proposals for Clean Growth in Natural Resources program</p> <p>PT Canadian Energy Strategy working group meetings (ongoing); Consultations on the Energy Innovation Program and Clean technology priorities; Outreach to PTs on clean technology priorities</p>	<p>"Doors open" at the Clean Growth Hub</p>		<p>Launch of Impact Canada clean technology prize-based challenges</p>

LEGEND	Consultation or Negotiation	Meeting or Event	Key Milestone or Document	Legislation or Agreement	Cabinet or Treasury Board
--------	-----------------------------	------------------	---------------------------	--------------------------	---------------------------

PCF Component	November 2017	December 2017	January 2018	Rest of 2018
PCF Reporting	Results.ca launch (Nov 3)	Final CCME progress report, and final Synthesis report submitted to FM (early Dec) PCF Announceables (Dec 9)		
Domestic Climate Change Related Funding				
International events	COP 23 Meeting (Nov 6-17, Bonn) Minister co-chairing CCAC High Level Assembly (on the margins of COP) (Nov 14, Bonn) Meeting of the NAFTA Advisory Committee (Oct 3, Oct 24, Nov 13, Nov 28) Montreal Protocol and the Vienna Convention (Nov 20-24, Montreal)	Paris Summit (Dec 12)		

LEGEND	Consultation or Negotiation	Meeting or Event	Key Milestone or Document	Legislation or Agreement	Cabinet or Treasury Board
--------	-----------------------------	------------------	---------------------------	--------------------------	---------------------------

23/11/2017

- ECCC
- ISED
- NRCan
- AAG
- Infrastructure Canada
- Transport Canada
- CMHC
- PCO
- TBS

<i>Date</i>	<i>Meeting</i>	<i>Place</i>	<i>Province(s) / Territories</i>	<i>Attendees</i>	<i>Items for discussion</i>
OCTOBER 30 to NOVEMBER 3					
November 2-3	FPT Agriculture Policy and Regulatory ADMs	Ottawa, ON	Multilateral		implementation of the Canadian Agricultural Partnership and review of business risk management programming and trade
November 3	Accelerated Coal and Natural Gas Regulations updated with broad stakeholder group (impacted Provinces and Territories, National Indigenous Organizations, and industry/manufacturers)	Teleconference/Webinar	Multilateral	Paola Mellow, Director, Electricity and Combustion	Accelerated coal phase-out and performance standards for new and modified natural gas electricity generation
November 3	CCME Ministers meeting	Vancouver, BC	Multilateral		Pan-Canadian Framework, Air Quality, Mercury Emissions
November 3	Federal, Provincial, Territorial Assistant Deputy Minister Consultative Committee on the Clean Fuel Standard	Teleconference	Multilateral	John Moffet (ECCC) Lynne Patenaude (ECCC) Terence Hubbard (NRCan) Others (TBD)	Discussion of ToR, overview of stakeholder comments received on CFS. Discussion of next steps.
NOVEMBER 6 to NOVEMBER 10					
November 7-14	Building Regional Adaptation Capacity and Expertise (BRACE) Program	Teleconference	Bilateral with each Province	Chris Jennings, Director and Mary-Ann Wilson, Manager at NRCan Climate Change Impacts and Adaptation Division	Consult on Provincial priority initiatives for BRACE

23/11/2017

- ECCC
- ISED
- NRCan
- AARL
- Infrastructure Canada
- Transport Canada
- CMHC
- PCO
- TBS

<i>Date</i>	<i>Meeting</i>	<i>Place</i>	<i>Province(s) / Territories</i>	<i>Attendees</i>	<i>Items for discussion</i>
November (TBC)	FPT Ministers of Housing	Teleconference	Multilateral		National Housing Strategy
NOVEMBER 13 to NOVEMBER 17					
November 7-14	Building Regional Adaptation Capacity and Expertise (BRACE) Program	Teleconference	Bilateral with each Province	Chris Jennings, Director and Mary-Ann Wilson, Manager at NRCan Climate Change Impacts and Adaptation Division	Consult on Provincial priority initiatives for BRACE
November 15	EVAFIDI-B.C. collaboration	TBD	B.C and NRCan	[REDACTED] (B.C. Ministry of Energy, Mines and Petroleum Resources)	Signature of a specified purpose account agreement of \$2 M for the management and alignment for B.C EV fast chargers.
November 16	Canadian Council of Forest Ministers Coordination Committee	Teleconference	Multilateral	Rory Gilsean, Director General, CFS, NRCan	Update on publication of Forest Ministers progress report on the PCF and input provided on PCF synthesis report
NOVEMBER 20 to NOVEMBER 24					
November 20	Steering Committee on Energy Efficiency (DG-level committee under EMMC)	Teleconference	All PTs	Joyce Henry, DG, OEE, and all OEE Directors	EMMC 2017 outcomes 2017-18 Work Plan, Generation Energy Outcomes
November 20	FPT Climate Leadership Community of Practice	Teleconference	All Provinces and Territories	Co-chaired by Nick Xenos, Executive Director of the Centre for Greening Government and	Clean procurement / clean technology; federal/regional collaboration in greening operations/

23/11/2017

- ECCC
- ISED
- NRCan
- AAF
- Infrastructure Canada
- Transport Canada
- CMHC
- PCO
- TBS

<i>Date</i>	<i>Meeting</i>	<i>Place</i>	<i>Province(s) / Territories</i>	<i>Attendees</i>	<i>Items for discussion</i>
				Ex Director, BC Gov	
November 23 or 24 (TBC)	Clean Fuel Standard FPT ADM Meeting	Teleconference	All Provinces and Territories	John Moffet (ADM) Helen Ryan (Director General, Energy and Transportation Directorate), Doug Heath (Director, Cross-Sectoral Energy Division) Cam Carruthers (Director, Oil, Gas and Alternative Energy Division), Clean Fuel Standard team	Policy impacts, design options and interactions raised during Clean Fuel Standard consultation.
November 23	Meeting with western provinces on federal methane regulations	Calgary, AB	BC/AB/SK	Helen Ryan (Director General, Energy and Transportation Directorate), James Diamond (Manager, Upstream Oil and Gas Section)	To discuss progress made with the finalization of the federal methane regulations for the upstream oil and gas sector
NOVEMBER 27 to DECEMBER 1					
November 28-29	ADM Energy Steering Group Face-to-Face (ADM-level committee under EMMC)	Montreal, Quebec	All PTs	Joyce Henry, DG, OEE	Working Group work plans toward Energy and Mines Ministers' Conference 2018 in Nunavut
End of November	FPT Energy Codes Implementation Group	Teleconference	Multilateral	Sarah Stinson, Director, Buildings and Industry Division, NRCan	Building energy codes implementation and support discussion
DECEMBER 4 to DECEMBER 8					

23/11/2017

- ECCC
- ISED
- NRCan
- AAFC
- Infrastructure Canada
- Transport Canada
- CMHC
- PCO
- TBS

<i>Date</i>	<i>Meeting</i>	<i>Place</i>	<i>Province(s) / Territories</i>	<i>Attendees</i>	<i>Items for discussion</i>
Early December	Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative – Call for Proposal Open	Teleconference/Email communications		TBD	Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative – Call for Proposal Open
DECEMBER 11 to DECEMBER 15					
December 13	Stationary Compression-Ignition Federal/Provincial/Territorial working group (closing meeting)	Teleconference	Multilateral	Paola Mellow (Director, Electricity and Combustion), Magda Little (Manager), Mia Batchelor (Manager) and team	Technical and jurisdictional considerations with setting emission standards for new stationary diesel engines
December (TBC)	FPT ZEV Steering Group Meeting	Teleconference	All PTs	Ellen Burack, DG Transport Canada, Charles Vincent, DG ISED	To advance framework for ZEV strategy
December 20	Canadian Council of Forest Ministers Coordination Committee	Teleconference	Multilateral	Rory Gilsenan, Director General, CFS, NRCan	Discussion on improvements to PCF reporting for next year
DECEMBER 18 to DECEMBER 22					
December 20	Canadian Council of Forest Ministers Coordination Committee	Teleconference	Multilateral	Rory Gilsenan, Director General, CFS, NRCan	Discussion on improvements to PCF reporting for next year
JANUARY					
January (TBC)	Industrial Working Group on Energy Efficiency (EMMC)	Teleconference	All PTs	Sarah Stinson, Chair	Accelerating uptake of energy management by industry in Canada, including PCF

23/11/2017

- ECCC
- ISED
- NRCan
- AAHC
- Infrastructure Canada
- Transport Canada
- CMHC
- PCO
- TBS

<i>Date</i>	<i>Meeting</i>	<i>Place</i>	<i>Province(s) / Territories</i>	<i>Attendees</i>	<i>Items for discussion</i>
					implementation, industry competitiveness, and information exchange.

DRAFT – FOR COMMENTS AND INPUT

FORWARD AGENDA**ADM AND DM OVERSIGHT COMMITTEE ON THE
PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE****December 2017**

ADM Meeting only (Dec 13)

- Indigenous Housing, Building Codes, and Energy Efficiency Housing on Reserve (INAC, CMHC, NRCan)
- Forward Agenda Strategic Planning Discussion
- NRCan Green Infrastructure Programming (TBD)

Additional Items

- Market Transformation Strategies for Energy-Using Equipment in the Building Sector (NRCan)
- Working with Indigenous Peoples to implement the PCF (ECCC) (December/early 2018)
- Generation Energy: Discussion of Report (NRCan) (early 2018)
- Federal coordination of investment on reducing reliance on diesel in remote and northern communities (INAC & NRCan) (early 2018)
- [REDACTED]
- Electricity Infrastructure and Interconnections (INFC, NRCan)
- Buildings Strategy (progress update on horizontal efforts, industry consultations, PT needs assessment) (NRCan)
- Youth Participation (ECCC)
- Final HFC Regulations (ECCC)
- Carbon pricing – Completion of Territorial Review and Indigenous Engagement (ECCC)
- Charter/Reporting on Results (ECCC)
- Climate Change Science Plan – Delivering and Communicating CC Knowledge/Human Dimensions of CC (ECCC)
- Addressing climate change-related health risks (HC & PHAC)
- Impact Canada-Clean Technology Stream (NRCan)
- ZEV – Status
- Climate Services – Status
- LCEF –Status
- Adaptation - Status
- Canadian Agricultural Partnership (AAFC) (tentatively April 2018)
- [REDACTED]



Infrastructure
Canada

Ottawa, Canada
K1P 0B6

BRIEFING NOTE TO THE MINISTER

PROGRESS REPORT ON THE PAN-CANADIAN FRAMEWORK PREPARED ON BEHALF OF MINISTERS RESPONSIBLE FOR INFRASTRUCTURE

(For Signature)

ISSUE

- Relevant federal-provincial-territorial (FPT) ministerial tables must develop annual progress reports that outline their efforts to implement the Pan-Canadian Framework on Clean Growth and Climate Change.
- The purpose of this note is to secure your approval of the Progress Report (Annex A) prepared on behalf of the FPT Ministers responsible for infrastructure. The Report will then be shared with First Ministers on December 9, 2017, as a companion to an overarching public Synthesis Report detailing overall progress.
- The Progress Report will not be made public.

BACKGROUND

- FPT ministerial tables involved in the implementation of the Framework will be required to submit annual Progress Reports on an ongoing basis. These reports are meant to inform the development of an annual Synthesis Report (Annex B), which is prepared by Environment and Climate Change (ECCC) on behalf of a Coordinating Committee of Experts comprised of FPT Intergovernmental Affairs Ministers.
- The Ministers responsible for infrastructure have relatively few concrete details to share in this inaugural report, as the Investing in Canada Infrastructure Program – which includes two climate-focused sub-streams under the Green Infrastructure Stream – remains in the early stages of roll-out. Instead, the federal input outlines the suite of funding tools in development and highlights co-benefits achieved through existing programs.
- Consolidated results across all tables will be made public through the Synthesis Report, which will be presented to First Ministers on December 9, 2017. This date has been chosen to coincide with the Framework's first anniversary.
- Progress reports developed by individual FPT ministerial tables will be shared with First Ministers as part of the Synthesis package, but these individual reports will not be made public.
- Individual tables may elect to release their reports, should they feel it appropriate to do so. To facilitate the rapid development of this report, Infrastructure Canada (INFC) has not asked its provincial and territorial interlocutors to vet the Progress Report for public release.

CONSIDERATIONS

- INFC approached provinces and territories on a number of occasions to solicit input to the Progress Report. The Progress Report was highlighted at the Deputy Minister-level FPT Meeting held in Ottawa in September, and a draft document was circulated for review and comment in October.

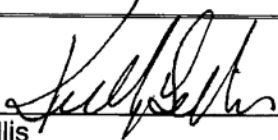
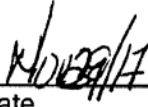
- None of the responding provinces and territories expressed significant reservations about the document or its content, and provincial/territorial input was inserted with minimal alteration.
- INFC has also worked with ECCC to refine the content of its Synthesis Report and ensure that results detailed in the Progress Report are suitably referenced.
- Provinces and territories are expected to focus their attention on the content of the Synthesis Report, as it will be made public. ECCC has circulated a draft of the Synthesis Report to provinces and territories for their review and approval.

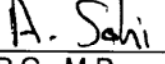
RECOMMENDATION

- It is recommended that you approve the attached Progress Report for distribution to First Ministers as part of a package accompanying the Synthesis Report.

NEXT STEP

- Should you concur, the Progress Report will be shared with ECCC. ECCC will coordinate distribution to First Ministers on December 9, 2017.

	
Kelly Gillis Deputy Minister Infrastructure and Communities	Date

<input checked="" type="checkbox"/> I approve.	<input type="checkbox"/> I do not approve.	<input type="checkbox"/> For discussion.
		
Amarjeet Sohi, P.C., M.P. Minister of Infrastructure and Communities		DEC 07 2017 Date

Attachments:

Annex A – Federal, Provincial, and Territorial Ministers Responsible for Infrastructure: Progress Report on Implementation of the Pan-Canadian Framework on Clean Growth and Climate Change (For Approval)

Annex B – Pan-Canadian Framework on Clean Growth and Climate Change: First Annual Synthesis Report on the Status of Implementation (Draft – For Information)

Annex A

Federal, Provincial and Territorial Ministers Responsible for Infrastructure

**Progress Report on Implementation of the Pan-Canadian Framework
on Clean Growth and Climate Change**

Fall 2017

TABLE OF CONTENTS

Introduction.....	3
<i>Achieving Collaborative Results</i>	<i>3</i>
<i>Reporting Structures and Scope of this Report</i>	<i>3</i>
Overall Analysis of Progress.....	5
<i>Supporting the Pan-Canadian Framework through Early Investments under the Investing in Canada Plan.....</i>	<i>5</i>
 PROGRAMS AND INVESTMENTS SUPPORTING GHG MITIGATION	5
The Public Transit Infrastructure Fund	5
The Green Municipal Fund.....	5
The Municipalities for Climate Innovation Program.....	6
 PROGRAMS AND INVESTMENTS SUPPORTING ADAPTATION AND RESILIENCE TO CLIMATE CHANGE...	6
The Clean Water and Wastewater Fund.....	6
The Municipal Asset Management Program	6
<i>Supporting the Pan-Canadian Framework through the Next Step of the Investing in Canada Plan.....</i>	<i>7</i>
 UPCOMING PROGRAMS SUPPORTING GHG MITIGATION.....	7
The Public Transit Stream	7
The Green Infrastructure Stream.....	8
The Canada Infrastructure Bank	8
Specific Actions to Implement Framework Objectives Undertaken in 2017	8
 Making New Buildings More Energy Efficient	9
Retrofitting Existing Buildings	9
Shifting from Higher- to Lower-Emitting Modes and Investing in Infrastructure.....	11
Using cleaner fuels	16
 Reporting and Oversight	17
Additional Public Infrastructure-Based Results.....	18

Introduction

In December 2016, First Ministers¹ endorsed the Pan-Canadian Framework on Clean Growth and Climate Change, an ambitious and achievable plan to grow the economy, reduce greenhouse gas (GHG) emissions and build resilience to a changing climate. The framework was developed through a collaborative approach, as outlined in the Vancouver Declaration, and recognized the need for fair and flexible approaches to support the diversity of provincial and territorial economies. The framework builds on the leadership and actions of provinces and territories to reduce GHG emissions and address climate change. New actions taken as part of the framework will contribute to meeting or exceeding Canada's 2030 climate change target of a 30% reduction in GHG emissions below 2005 levels.

The framework is built on four main pillars: pricing carbon pollution; complementary measures to further reduce emissions across the economy; measures to adapt to the impacts of climate change and build resilience; and actions to accelerate innovation, support clean technology, and create jobs. This report will focus on the progress that federal, provincial, and territorial governments have made in 2017 in implementing measures in the framework that fall under the purview of Ministers responsible for infrastructure. The report also looks ahead toward future actions in 2018-2019 and beyond.

Achieving Collaborative Results

Implementing the framework involves numerous ministries across federal, provincial and territorial governments.

This collaborative reporting process mirrors the multilateral nature of ongoing efforts to both address the Canadian infrastructure gap and respond to climate change. To this end, governments continue to make historic investments and create concerted partnerships that will accord individual jurisdictions the flexibility needed to apply federal funding to their most pressing priorities.

Reporting Structures and Scope of this Report

In this context, the Ministers responsible for infrastructure are working together to consolidate federal, provincial, and territorial results linking infrastructure development to the climate change objectives of the framework, with specific focus on public transit. While this report is not intended for direct public consumption, the report will be forwarded to First Ministers for information, and the results reported here will inform the final public report to First Ministers developed by the Coordinating Committee of Experts.

¹ Manitoba and Saskatchewan have not signed onto the Framework.

This report seeks to highlight a number of results achieved over the course of 2017 in areas overseen by the Ministers responsible for infrastructure. However, there are additional programs, projects and initiatives related to infrastructure that will be captured through the reports of other Ministerial tables. These include:

- Adaptation and resilience measures –reporting led by the Canadian Council of Ministers of the Environment (CCME);
- Measures to increase access to clean energy transportation – reporting led by federal, provincial and territorial (FPT) Ministers of Transportation;
- Measures to increase capacity to generate and manage clean energy – reporting led by FPT Ministers of Energy; and
- Measures to increase energy efficiency in the built environment – reporting led by FPT Ministers of Energy.

This document reports on achievements specific to public infrastructure that will support the framework's objectives, and which have not otherwise been captured by the reporting led by the other tables referenced above. Of particular note, given the specialized role of the CCME which leads overall reporting on adaptation measures, adaptation-focused progress and results emerging from the Investing in Canada Infrastructure Program (ICIP), Disaster Mitigation and Adaptation Fund, and the Climate Resilient Buildings and Core Public Infrastructure Project will be identified through their report.

In the pages that follow, an overall analysis of progress will provide an overview of various infrastructure programs which produce benefits in provinces, territories, municipalities and Indigenous communities that reinforce the framework's overall objectives. The report subsequently identifies a series of federal, provincial and territorial measures undertaken to advance outcomes that are directly aligned with specific Complementary Climate Actions identified in the framework, and outlines the table's specific plans linked to reporting and oversight. The results achieved in 2017 stem from a range of policies and programs implemented at all levels of government which have been implemented over recent years.

Overall Analysis of Progress²

Supporting the Pan-Canadian Framework through Early Investments under the Investing in Canada Plan

Budget 2016 announced federal infrastructure investments that would support the rehabilitation, repair and modernization of existing infrastructure. The initial stages of the Investing in Canada Plan committed \$11.9 billion in new funding for public transit infrastructure, green infrastructure and social infrastructure. Infrastructure Canada is managing the delivery of funding for the Public Transit Infrastructure Fund and the Clean Water and Wastewater Fund through bilateral agreements with provincial and territorial governments. The first agreement was signed less than three months after Budget 2016, and by August 2017 over 3,100 projects had been approved for federal funding. Going forward, federal, provincial and territorial governments will work in collaboration to address infrastructure gaps and support transformative projects that contribute to Pan-Canadian Framework's objectives through historic investments and concerted partnerships.

PROGRAMS AND INVESTMENTS SUPPORTING GHG MITIGATION

The Public Transit Infrastructure Fund

The \$3.4 billion Public Transit Infrastructure Fund was created in 2016 to make federal investments that would repair, rehabilitate and expand existing public transit systems across Canada, helping improve commutes, reduce air pollution, strengthen communities and grow Canada's economy. This program's results to date are described later in this document, and linked to their corresponding Complementary Climate Actions under the Pan-Canadian Framework for Clean Growth and Climate Change.

The Green Municipal Fund

Budget 2016 provided a \$125 million top-up to the Green Municipal Fund, managed by the Federation of Canadian Municipalities (FCM). The Green Municipal Fund was established to generate a positive impact on the health and quality of life of Canadians by reducing greenhouse gas emissions, improving local air, water and soil quality, and promoting renewable energy by supporting environmental studies and projects within the municipal sector. Eligible projects may fall into one or more of the following areas: energy, water, waste, sustainable transportation, brownfields, or integrated community projects.

The Green Municipal Fund's 2016-17 Annual Report notes that since its inception in 2000, it has committed to provide over \$759 million to support 199 environmentally-focused capital

² While this report speaks to results achieved during calendar year 2017, many of the federal programs described below were first announced via Budget 2016, and some began generating results late in that same year. In its capacity as the first annual report on results under the Pan-Canadian Framework on Clean Growth and Climate Change, this document includes those early results. Further, where programs report their results according to the fiscal year ending March 31 this report reflects the results available from the most recently completed fiscal year.

projects in communities across Canada, including 9 commitments in 2016-2017. The initiatives approved in 2016-2017 will produce an estimated annual GHG emission reduction of 91,806 tonnes, while the fund's overall portfolio of funded initiatives have collectively reduced GHG emissions by 628,051 tonnes per year.

The Municipalities for Climate Innovation Program

Budget 2016 allocated \$75 million to the FCM to establish the Municipalities for Climate Innovation Program, which provides funding, training, and resources to help municipalities adapt to the impacts of climate change and reduce greenhouse gas emissions.

The types of initiatives the 5-year program supports include:

- Reducing GHG emissions from waste collection trucks through the optimization of routes and the reduction of the frequency of garbage and recycling pick-up;
- Assessing vulnerability to flooding of buildings in a neighbourhood;
- Planning that encourages residents to use less polluting forms of transportation such as cycling, walking and transit; and
- Changing municipal policy, such as introducing no-idling policies.

The ultimate outcome of the program is to increase the number of municipalities in Canada that are low-carbon and benefit from climate resilient infrastructure. More municipalities will have established GHG reduction objectives and implement action plans, policies, and investment decisions to achieve initial or deep GHG emissions reduction targets. Future infrastructure investments will also be designed to account for expected changes in climate.

PROGRAMS AND INVESTMENTS SUPPORTING ADAPTATION AND RESILIENCE TO CLIMATE CHANGE

The Clean Water and Wastewater Fund

In addition to improving the capacity and environmental performance of Canada's water, wastewater, and stormwater systems, the \$2 billion Clean Water and Wastewater Fund, managed by Infrastructure Canada, supported investments in 239 flood mitigation projects. These reduce the vulnerability of communities and public infrastructure to the negative impacts of flooding events. Roughly 18% of these projects helped address flood risk and reduce the potential for wastewater treatment systems being overwhelmed by separating wastewater and stormwater collection pipes. These projects are delivering benefits to residents by better protecting their families, property and livelihoods.

The Municipal Asset Management Program

Budget 2016 announced that \$50 million would be allocated to the FCM for the Municipal Asset Management Program, a five-year program designed to help Canadian municipalities make informed infrastructure investment decisions—including through the consideration of climate effects, such as how local weather patterns will change over the long term.

The program launched in February 2017. Municipalities can access grants to fund activities such as asset management needs or risk assessments; asset management plans, policies and strategies; data collection and reporting; asset management training and organizational development; and knowledge transfer, development and sharing. The ultimate result the program seeks to achieve is that municipal infrastructure investment decisions are made with a view to better long-term asset management.

Supporting the Pan-Canadian Framework through the Next Step of the Investing in Canada Plan

Guided by the Investing in Canada Plan's principles, the Government of Canada has established a comprehensive program known as the Investing in Canada Infrastructure Program (ICIP) to make significant investments in order to realize identified objectives and outcomes. These investments are organized into four funding streams: public transit; green infrastructure; community, culture, and recreational infrastructure; and rural and northern infrastructure. The green infrastructure envelope, which breaks down across three sub-streams, seeks to mitigate the factors driving climate change, promote resilience, adaptation and disaster mitigation efforts, and improve overall environmental quality.

UPCOMING PROGRAMS SUPPORTING GHG MITIGATION

The Public Transit Stream

From Canada's small towns to its largest urban centres, efficient public transit is vital to the functioning of communities. Public transit helps to reduce traffic on roads so they can accommodate other economic activity.

The Investing in Canada Plan devotes \$23.5 billion to public transit, \$20.1 billion of which will be delivered through Integrated Bilateral Agreements with the provinces and territories under the ICIP. A significant portion of this funding is allocated to provinces and territories using a formula based on ridership (70%) and population (30%) to balance demands on existing systems funding system expansions to accommodate population growth. Within each jurisdiction, funding is further allocated to existing public transit systems based on their respective ridership, with some flexibility possible to address regional requirements.

By improving the capacity, quality, safety and accessibility of public transit infrastructure throughout Canada, investments will lead to reduced urban congestion, and improved access to jobs and growth for all Canadians. They will support the transition to a low-carbon economy and provide positive environmental effects by reducing air pollution and GHG emissions. The investments will also enhance mobility options and strengthen opportunities for all Canadians to contribute to their communities.

The Green Infrastructure Stream

The Government has made it a priority to address climate change and move Canada to a prosperous, clean growth, resilient, low-carbon economy. Infrastructure funding is a critical tool for advancing climate change mitigation and adaptation outcomes.

The overarching Investing in Canada Plan devotes \$26.9 billion to the green infrastructure investment stream. Starting in 2018, the ICIP will provide \$9.2 billion for green infrastructure to support GHG mitigation projects in the provinces and territories; infrastructure that will help communities prepare for the challenges of climate change; and other green infrastructure that supports a healthy environment, such as water and wastewater infrastructure. Further, at least 45% of each province's green stream allocation—equivalent to a combined total of at least \$3.8 billion—must support assets intended to mitigate GHG emissions.

Specific outcomes promoting emissions mitigation under the ICIP's Green Infrastructure-Climate Change Mitigation sub-stream include:

- Increased generation of clean energy;
- Increased capacity to manage more renewable energy;
- Increased energy efficiency of buildings; and
- Increased access to clean energy transportation.

Through alignment with these outcomes, investments made under this sub-stream will reduce GHG emissions to offset the effects of climate change and help meet Canada's commitments under the Paris Agreement.

The Canada Infrastructure Bank

The Canada Infrastructure Bank will work with provincial, territorial, municipal, Indigenous, and private sector and institutional investment partners to transform the way infrastructure is planned, funded and delivered across the country, attracting private sector capital for infrastructure projects with revenue-generating potential. Investments will further the high-level policy objectives of the Investing in Canada Plan, including climate change objectives.

Specific Actions to Implement Framework Objectives Undertaken in 2017

The following section matches federal, provincial and territorial activities undertaken in 2017 with explicitly targeted Complementary Actions highlighted through Pan-Canadian Framework on Clean Growth and Climate Change.

As noted previously, this section does not speak to infrastructure-focused adaptation, resilience and disaster mitigation programs and projects, as this reporting has been captured by the report developed by the Canadian Council of Ministers of the Environment.

BUILT ENVIRONMENT

Ministers responsible for supporting:

- **3.2.1 Making new buildings more energy efficient; and**
- **3.2.2 Retrofitting existing buildings**

Federal Results

The Green Infrastructure-Climate Change Mitigation stream of the Investing in Canada Infrastructure Program (ICIP) will support efforts to increase energy efficiency in new and existing public infrastructure. Infrastructure Canada is currently working with its provincial and territorial interlocutors to develop Integrated Bilateral Agreements for the ICIP. Individual energy efficiency projects must be prioritized by the responsible provincial or territorial government in order to receive support through this program.

Provincial and Territorial Results**Alberta**

The Government of Alberta has instituted a number of initiatives and programs, including:

Rooftop Solar Panels

- Alberta has installed and continues to install rooftop solar panels on its provincial buildings. Since October 2016, the Ministry of Infrastructure has committed to installing 854.7kW of solar photovoltaics on government owned buildings (Lethbridge Provincial Building, High River Community Resource Centre, J.G. O' Donoghue Building, Pincher Creek Building, and the Learning Resources Centre).
- The government has also approved a solar program for schools across the province.

Building Retrofits

- Alberta is retrofitting buildings to increase density as well as increase the efficiency of mechanical and electrical equipment.
- Where feasible, solar panels are also being installed as part of the retrofit project to reduce demand on the electricity grid.

Energy Efficiency

- Energy Efficiency Alberta has rebate programs available for all Albertans for energy efficient products such as lighting, heating controls, appliances, and even solar panels.
- Sustainable Technologies for Capital Projects.
- The Ministry of Infrastructure is conducting a feasibility study to assess and prioritize enhanced sustainable technologies for capital projects that achieve the highest

greenhouse gas emissions aversions or reductions and provide economic, environmental, and social value.

- The feasibility study will ensure that sustainable technologies are applied to new-build and retrofit projects in a way that makes the most sense and ensures best value by accounting for the following factors: geo-climatic impacts, location factors, life-cycle costs, site factors, and building types on the potential greenhouse gases averted or reduced.

Newfoundland and Labrador

The Provincial Government continued to implement its Build Better Buildings policy in 2017, building on its successes to date. The policy requires that new buildings and large renovations receiving any level of provincial capital funding be built sustainably, which includes:

- Exceeding the 1997 Model National Energy Code for Buildings by 25 percent; and
- Striving for a Silver rating under the Leadership in Energy and Environmental Design (LEED) sustainable building certification program.

Since the policy came into effect in September 2010, a total of 24 buildings have achieved some level of LEED certification within the province, including nine buildings in 2017 (i.e. one LEED Gold, five LEED Silver, and three LEED Certified).

Among those successes is the new Metrobus Transit Terminal in the City of St. John's, which became a LEED Certified building in August 2016. This state-of-the-art public transit facility includes energy-efficient geothermal heating, high recycled content building materials, and accommodations for the fleet's on-board bike racks. The new facility will also help Metrobus manage its operations more efficiently, and accommodate future expansion of the public transit system in St. John's and the surrounding area.

In June 2017, the Provincial Government received a Government Leadership Award from the Canada Green Building Council (CaGBC) for its initiatives within the public sector to advance change and improve performance in sustainable building practices.

Northwest Territories

The Government of Northwest Territories (GNWT) completed Capital Asset Retrofit Fund projects in many Northwest Territories (NWT) communities, including Fort McPherson, Inuvik, Norman Wells, Inuvik, Hay River, Fort Smith, Wrigley and Yellowknife.

The GNWT invests annually in its Capital Asset Retrofit Fund (CARF) Program to target energy efficiency investments in NWT public buildings. The Program strives to:

- Reduce energy consumption and operational costs of government facilities;
- Improve overall comfort for building users;
- Reduce greenhouse gas emissions associated with the operation of our public buildings;

- Increase the usable life of government assets; and
- Identify new energy technologies appropriate for our northern environment.

Through the CARF Program, buildings undergo a rigorous energy audit that includes benchmarking a facility to see how its energy usage compares to other similar buildings. Retrofit measures include heating, ventilation and air conditioning (HVAC) upgrades, solar power installations, building envelope upgrades, LED lighting upgrades, and heat recovery and control optimization projects.

TRANSPORTATION

Ministers responsible for:

- **3.3.3 Shifting from higher- to lower-emitting modes and investing in infrastructure**

Public Transit

Federal Results

The Public Transit Infrastructure Fund is focused on making immediate investments of \$3.4 billion over three years to upgrade and improve public transit systems across Canada. Results achieved to date include:³

- **Improved Transit Capacity and Environmental Performance**
Through this fund, over 900 older buses are being replaced with newer, more reliable, and more efficient vehicles. This is in addition to the 775 new buses that have been ordered to expand current transportation networks, offering up over 42,000 additional seats to commuters. Over one-third of those new buses will also be better for the environment than traditional diesel buses, using compressed natural gas, bio-diesel, electric or hybrid technologies to dramatically reduce greenhouse gas emissions. These investments will help increase bus frequency, expand the areas serviced, and ease traffic congestion for all commuters, while better protecting the environment
- **Increased System Accessibility**
Investments under the Public Transit Infrastructure Fund will help Canadians access employment, social networks and other opportunities, by increasing the accessibility of our public transit networks. Almost 500 new para-transit buses will offer transportation solutions to those unable to use traditional bus services, while investments will make 81 existing transit facilities more accessible for everyone.

³ Note that in certain cases the public transit results reported by provincial and territorial governments may have been supported through this federal funding envelope.

- **Expanded and Better Integrated Active Transportation Systems**

The Government of Canada approved over 200 projects that will better integrate alternative and active transportation options into existing public transit systems. As a result, new bicycle storage areas are being built at bus stations, bus racks are being added to buses and transit hubs are being built to intersect with active transportation trails. In all, over 120 kilometres of new trails will support these new multi-modal commuter networks thanks to this funding.

- **State of Good Repair**

A key objective of the Public Transit Infrastructure Fund was to bring existing systems into a state of good repair. Over 50% of approved projects went towards meeting that objective with over 553 major repair and rehabilitation projects to transit vehicles, rails and stations are now well underway.

As part of the next step of the Investing in Canada Plan, support for public transit initiatives is now being made available through two separate streams of the ICIP. Public transit projects that expand access to clean energy transportation are eligible for support under the Green Infrastructure-Climate Change Mitigation sub-stream, while the broader Public Transit stream, will support projects that improve the capacity, quality, and safety of public transit infrastructure, and increase access to public transit systems. Infrastructure Canada is now working with its provincial and territorial interlocutors to develop Integrated Bilateral Agreements for the ICIP. Individual projects must be prioritized by the responsible provincial or territorial government in order to receive support through this program.

Provincial and Territorial Results

Alberta

The Government of Alberta is supporting public transit through a number of programs and initiatives, including:

The Green Transit Incentives Program (GreenTRIP)

- In July 2016, GreenTRIP criteria was expanded to allow municipalities to apply for funding for a broader range of transit projects. The \$2 billion grant program (originally launched in 2008) provides funding to municipalities and eligible transit commissions for capital transit projects that support new or expanded public transit systems. The Ministry of Transportation administered a final call for the Green Transit Incentives Program (GreenTRIP) submissions in December 2016.

LRT Funding

- In July 2017, Alberta announced \$1.53 billion in funding over eight years to build the new Green Line LRT in Calgary. Work is continuing on the Green Line LRT. Stage 1 is projected to begin construction in 2020, and is anticipated to open in 2026.

- In September 2017, Alberta announced an additional \$176 million grant over three years to support the Southeast Valley Line LRT in Edmonton. This brings Alberta's total contribution for the project to \$600 million in funding. The Southeast Valley Line is scheduled for completion in 2020.

Saskatchewan

Municipalities in Saskatchewan have made investments in the areas of:

Making new buildings more energy efficient

- Construction of a new maintenance facility in Regina in order to eliminate approximately 70 tonnes/year of CO² produced by shuttling around buses

Improved transit capacity and environmental performance

- Procure 61 conventional buses for Regina, Saskatoon and Moose Jaw to increase ridership and modal share, while reducing average CO² emissions per kilometre

Increased system accessibility

- Upgrade bus shelters and accessibility in Regina and Saskatoon to improve service and remove barriers for those with disabilities
- To improve accessibility of services, procure:
 - 10 paratransit buses for Regina
 - 12 access buses for Saskatoon
 - 3 low floor buses for Prince Albert

Expanded and better integrated transportation systems to increase modal share

- Construct an express route and purchase 3 buses for a new Arcola Express Bus Route in Regina
- Undertake functional planning and preliminary design work for a future Bus Rapid Transit system in Saskatoon

Québec

The Ministry of Transport for Sustainable Mobility and Transport Electrification manages government assistance programs to improve urban and regional public transport services and support transport authorities in their efforts to increase the supply of public transit services as well as encourage greater use of public transit to, inter alia, reduce GHG emissions associated with passenger transportation.

These programs support public transit infrastructure in a number of ways and represent significant financial efforts directly related to the fight against climate change:

- \$562 million in 2017-2018 for the government's public transit assistance program (PAGTCP);
- \$128 million in 2017-2018 for the Québec Local Infrastructure Corporation's Transit Capital Assistance Program (SOFIL);
- \$1.7 billion over the 2016-2018 period for the Public Transit Infrastructure Fund's financial assistance program (\$924 million in funding from the federal government);
- \$140 million in 2017-2018 for the Transit Development Assistance Program.

Recent improvements have been made to these various programs and will increase public transit service offerings across Québec by 10%. Notably:

- The PAGTCP has seen its period extended, and the rate of financial assistance increased from 75% to 100% for some projects;
- The categories of assets eligible for the PAGTCP and SOFIL's assistance programs have been expanded to include the capital expenditures required to operate a paratransit system and used service vehicles.

Newfoundland and Labrador

The Provincial Government has supported the City of St. John's in implementing several projects under the Public Transit Infrastructure Fund that will help shift from higher to lower-emitting modes of transportation and invest in infrastructure. These projects include:

- Accessibility improvements to install wheelchair-accessible shelters and sidewalks to provide additional public transit options to the Metrobus service area.
- Three new shorter, more fuel-efficient buses to replace several older models on less-busy routes
- Upgrades to an On Demand Scheduling system and a new transit priority system to improve route timing and make public transit a more convenient for users.

Northwest Territories

Federal funding for public transit improvements under Phase 1 of the Investing in Canada Plan were utilized to complete upgrades to transit infrastructure in the City of Yellowknife, including the replacement of bus shelters and increased accessibility

Active Transportation

Federal Results

Canadians are looking for more options to get to and from work, and other destinations like schools and stores. A growing method of commuting is active transportation – walking or cycling instead of using a vehicle. The Investing in Canada Plan encourages investments in active transportation infrastructure, such as dedicated bike paths and lanes. Investments in commuter-based active transportation will be eligible through both the new ICIP public transit funding stream, as well as the green infrastructure funding stream. These

investments will support the transition to a low-carbon society and bring positive environmental impacts through reduced air pollution and GHG emissions. They will also enhance mobility options and strengthen communities.

Provincial and Territorial Results

Alberta

The Government Alberta has implemented a registrar exemption to allow people riding e-bikes to wear bicycle helmets or motorcycle helmets (previously, motorcycle helmets were required).

Québec

In this sector, the Ministry of Transport for Sustainable Mobility and Transport Electrification continues its financial assistance program for cycling and pedestrian infrastructure to develop relevant infrastructure assets within municipal urbanization perimeters.

Newfoundland and Labrador

Newfoundland and Labrador's Provincial Government has supported the City of Corner Brook in implementing two active transportation projects under the Public Transit Infrastructure Fund. These projects include:

- Developing a new walking trail from the downtown area to the Three Bear Mountain trail, to better integrate the City's active transportation and public transit networks; and
- Extending the City's existing bikeway network.

Northwest Territories

Due to the small size of most NWT communities, active transportation within municipalities, like cycling and walking, is already quite common. Long distances between communities make these activities less common along major highways. The GNWT has made an effort to accommodate alternate road users on access roads and highways near communities by widening shoulders, installing crosswalks, or pedestrian pathways.

The GNWT has also been involved in a number of initiatives and projects in regards to active transportation in recent years. These initiatives include:

- Installation of "Share the Road" signs on Highways #3, #4 and the Yellowknife Access Road in and near Yellowknife;
- The NWT Road Safety Plan was prepared in 2015 to guide road safety programs over the next four years with a goal of reducing fatalities and injuries on highways, winter roads, community roads, ice crossings and trails. The Plan addresses the safety of vulnerable road users, including cyclists and pedestrians;

- The GNWT's Drive Alive Program, which ran from 2008 to 2014, included public awareness campaigns targeting the safety of pedestrians and cyclists. Bike helmets were distributed to school-aged children living in small communities between 2010 and 2012;
- Two metre wide paved shoulders were incorporated in the reconstruction of the first 7.5 kilometres of Highway #4 to accommodate cyclists, which opened in 2014;
- In November 2016, the City of Yellowknife constructed a multi-use trail parallel to the Yellowknife Access Road to improve the safety of active transportation users. The trail was constructed within the highway right-of-way. Work to construct a pedestrian pathway that will connect to and extend the trail is underway and installation of a crosswalk in the same location to facilitate safe access to the multi-use trail is expected to be completed by November 2017; and
- The GNWT designed and installed a zebra crosswalk with rectangular rapid flashing lighting on overhead pedestals for the Town of Hay River to provide safe access for pedestrians to the new Hay River Health Centre.

Ministers responsible for supporting:

3.3.4 Using cleaner fuels

Federal Results

Through the Green Infrastructure-Climate Change Mitigation sub-stream of the ICIP, Infrastructure Canada will support public infrastructure projects that promote increased public access to clean energy transportation, including through the use of alternative fuels. Infrastructure Canada is now working with its provincial and territorial interlocutors to develop Integrated Bilateral Agreements for the ICIP. Individual energy efficiency projects must be prioritized by the responsible provincial or territorial government in order to receive support through this program.

Provincial and Territorial Results

Newfoundland and Labrador

Through its Build Better Buildings policy, the Provincial Government continues to advance sustainable building designs and strategies across the province. As a result of these efforts to strive for LEED certification, a number of electric vehicle charging stations have been installed at provincially-funded buildings, including the Paradise Double Ice Complex, the Marystown Recreation Centre and the Mount Pearl Summit Centre.

Northwest Territories

The GNWT is developing a Climate Change Strategic Framework. Priorities and actions for

inclusion in the Framework are currently being identified, including building climate resilience in the NWT, with an expected release of the Framework and subsequent action plan for 2018. The framework will rest on three pillars. Among these pillars is "Economy, Innovation and Emissions" that involves using best practices and innovation to grow and diversify the NWT economy, while reducing reliance on imported fossil fuels and the resulting production of greenhouse gas emissions.

In addition, the GNWT is currently developing a long-term energy strategy which will set a target for reducing diesel for electricity production in remote communities. Accomplishments achieved include the commissioning of a variable speed generator and solar array in Aklavik, completed feasibility and design work for utility scale wind in Inuvik, and wind monitoring for smaller scale turbines in two communities. As part of this Strategy, the GNWT is engaging with industrial emitters to understand the potential for greenhouse gas emission reductions and efficiency improvements. To that end, it is expected the long-term energy strategy would include support for industry to reduce greenhouse gas emissions.

The GNWT has committed over \$2.7 million in 2017 to the Arctic Energy Alliance to provide energy efficiency programs and services to residents, businesses and communities.

Reporting and Oversight

Federal Results

CPPI Survey

The Investing in Canada Plan includes a commitment to improving data on the state and performance of core public assets. In July, 2017, INFC and Statistics Canada launched Canada's Core Public Infrastructure survey. The goal of this national survey is to improve the knowledge and understanding of Canada's core public infrastructure assets across the country (i.e. roads; bridges and tunnels; culture, recreation and sports facilities; social and affordable housing; public transit; solid waste systems; and potable water, wastewater and storm water systems). This will be Canada's first national survey regarding core public infrastructure representing over 95% of the total target population. Through a number of targeted questions within this survey, the Government of Canada hopes to establish a more consolidated view of the measures being implemented to address the impacts of climate change as they pertain to Canada's public infrastructure.

Introducing a Climate Lens for Shared Infrastructure Investments

The Investing in Canada Plan emphasizes that federal infrastructure spending should reduce or minimize GHG emissions and should build climate change resilience. Infrastructure Canada is developing a Climate Lens which will ensure project proponents consider GHG emissions mitigation and climate resiliency when they develop projects seeking funding through the Investing in Canada Infrastructure Program. Because a harmonized approach is critical, Infrastructure Canada is establishing a federal-provincial-territorial working group to develop

the Climate Lens.

Additional Public Infrastructure-Based Results

Newfoundland and Labrador

The Provincial Government continues to work with Regional Service Boards and municipalities across the province to fully implement the *Provincial Solid Waste Management Strategy*. Ongoing infrastructure investments to consolidate and close-out landfills in favour of modern facilities has helped reduce methane emissions from sites that now transport waste to the Robin Hood Bay regional waste management facility, which is equipped with methane capture and flaring technology.

In addition, the Provincial Government has made significant contributions to a broad range of water and wastewater projects under the Clean Water Wastewater Fund, the New Building Canada Fund and other provincial and federal-provincial programs. These investments include a \$10 million project in the City of Corner Brook to separate sewer and stormwater, thereby improving energy efficiency by reducing the volumes of wastewater to be treated.

Northwest Territories

The GNWT is developing a Waste Resource Management Strategy that would address solid waste. Specifically, it would outline a plan in terms of programs, initiatives and policies to reduce, divert and manage waste in the NWT.

Regarding water and wastewater treatment, under the Clean Water Wastewater Fund, a total of 29 projects were approved in 18 out of 33 NWT communities (representing 55% of NWT communities). The fund was managed through a competitive application process, targeting the community government infrastructure deficit. Such funding allowed for much needed rehabilitation and replacement in these water and wastewater treatment systems in these communities.

Working with the University of Fairbanks, Alaska, the NWT has generated projections of future climate conditions for NWT communities. The NWT has released an updated knowledge agenda to guide research efforts, including Traditional Knowledge and community-based research, and will develop an Action Plan to facilitate this work in 2018.

PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

FIRST ANNUAL SYNTHESIS REPORT ON THE STATUS OF IMPLEMENTATION

CONTENTS

EXECUTIVE SUMMARY.....	4
1 Introduction.....	6
2 Pricing Carbon Pollution	7
3 Complementary actions to reduce emissions	9
3.1 Electricity	9
3.2 Built environment.....	10
3.3 Transportation	11
3.4 Industry.....	12
3.5 Forestry, agriculture, and waste	12
3.6 Government leadership	13
3.7 International leadership	13
4 Adaptation and Climate Resilience.....	14
4.1 Translating scientific information and Traditional Knowledge into action.....	15
4.2 Building climate resilience through infrastructure	16
4.3 Protecting and improving human health and well-being	16
4.4 Supporting particularly vulnerable regions.....	17
4.5 Reducing climate-related hazards and disaster risks.....	18
5 Clean Technology, Innovation and Jobs	18
5.1 Building early-stage innovation	19
5.2 Accelerating commercialization and growth	19
5.3 Fostering adoption.....	20
5.4 Strengthening collaboration and metrics for success.....	21
6 Reporting and Oversight.....	21
Measurement and reporting on emissions	21
Reporting on implementation	22
Analysis and advice.....	22
Review	22
Commitment to continue to engage and partner with Indigenous Peoples.....	23
7 Looking Ahead	23
Pricing Carbon Pollution	23
Complementary actions to reduce emissions	23
Adaptation and resilience	24
Clean technology, innovation and jobs	25
Annex I: Status of all Pan-Canadian Framework Actions.....	25

Pricing Carbon Pollution	25
Mitigation	27
Adaptation and Climate Resilience	36
Clean Technology, innovation and jobs.....	39
Cross-cutting.....	43

EXECUTIVE SUMMARY

In response to the critical and urgent need to take action on climate change, Canada's First Ministers¹ adopted the Pan-Canadian Framework on Clean Growth and Climate Change on December 9th, 2016. This collaborative plan aims to reduce emissions, build resilience to a changing climate and enable sustainable economic growth. The Pan-Canadian Framework includes more than fifty concrete policy actions spanning the country and all sectors of the economy.

First Ministers directed federal, provincial, and territorial governments to work together and with meaningful involvement of Indigenous Peoples to implement the Pan-Canadian Framework and report back on progress. Given the breadth of the Framework, responsibility for putting it into action cuts across multiple government portfolios, and implicates Ministers responsible for environment, energy, infrastructure, transportation, forestry, agriculture, innovation, emergency management, and finance. This report summarizes the collaborative progress achieved across these nine areas and others, such as protecting human health.

Federal, provincial, and territorial governments are engaging and partnering with Indigenous Peoples as actions are implemented. In addition, in order to provide a structured, collaborative approach for ongoing engagement with Indigenous Peoples, the Government of Canada is collaborating with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation and partnership.

Summary of Progress

In the first year of implementation, federal, provincial, and territorial governments have made good progress in starting to put the Pan-Canadian Framework into action. Funding has been mobilized to support many of the new actions included in the Framework, including significant transfers from federal to provincial and territorial governments, as well as to representatives of Indigenous Peoples and governments. New regulations have been drafted and consulted on, and new policies and programs are being established and implemented in all jurisdictions. Governance, reporting and oversight structures have been established to track overall progress nationally and ensure success.

Work is underway to ensure **carbon pricing** applies across Canada. Some jurisdictions already have carbon pricing systems in place, while others are working to develop and implement pricing systems. In jurisdictions that do not implement a system that meets the federal benchmark, a carbon pricing backstop will apply.

Governments have made significant progress implementing **complementary measures to reduce emissions** across the economy. These include regulations – such as phasing out coal-fired power generation by 2030, reducing methane emissions from the oil and gas sector, continuing to improve the emissions performance of vehicles, and introducing a clean fuel standard. They also include work to develop and adopt increasingly stringent building codes to reduce energy use, as well as work to accelerate the uptake of zero emissions vehicles. These and other actions cut across all sectors of the economy, with the aim of reducing emissions or increasing carbon storage. New funding will support these mitigation activities, such as investments in clean and renewable power generation.

Actions are underway to advance **adaptation** efforts and build resilience to the impacts of the changing climate. This includes significant new infrastructure investments, including a \$2 billion cost-shared Disaster Mitigation and Adaptation Fund, and new actions being undertaken by jurisdictions to address flood risks exacerbated by climate change. New programs are being established that will help protect human health and vulnerable regions from climate change impacts, including programs that support healthy Indigenous communities. Codes and standards to support climate resilience are under development and efforts have been advanced to build regional capacity for adaptation action across all the priority areas identified in the Pan-Canadian Framework.

Governments are working to make Canada a leader in the global clean economy through a variety of actions focused on **clean technology, innovation, and jobs**. This includes work to create a strong pipeline of clean technology ideas while positioning Canada's energy, mining, forest and agriculture sectors as leaders in the new

¹ To note, Saskatchewan and Manitoba decided not to adopt the Pan-Canadian Framework.

resource economy. Federal, provincial and territorial governments are working together to enable access to capital for clean technology firms to help them develop and demonstrate the commercial viability of their new clean technology products. Programs are also being implemented to foster technology adoption through government procurement to support a strong domestic clean technology market. A federal Clean Growth Hub has been established to streamline government support for clean technology producers. Governments are also working together on a clean technology data strategy.

Looking Ahead

As federal, provincial, and territorial governments implement this Framework, they will continue to respect the rights of Indigenous Peoples with robust, meaningful engagement drawing on their Traditional Knowledge. A key priority is to strengthen the collaboration between governments and Indigenous Peoples on mitigation and adaptation actions, based on recognition of rights, respect, cooperation, and partnership. Indigenous Peoples will be important partners in developing real and meaningful outcomes that position First Nations, Inuit, and the Métis Nation as drivers of climate action in the implementation of the Pan-Canadian Framework.

While good progress has been made to date, much work remains. This includes continued work to implement carbon pricing systems across Canada in 2018, as well as to develop and finalize a variety of regulations, policies, and programs, including pan-Canadian collaboration on electricity interconnections, building codes, and a zero-emissions vehicle strategy. Other work includes launching new programs to support adaptation, finalizing green infrastructure investments, deepening engagement on clean technology innovation and ensuring effective implementation of clean technology investments and initiatives.

In future years, as funding begins to flow and policies and regulations come into force, the focus of subsequent reports will shift toward concrete results and outcomes to track progress. Over the coming year, federal, provincial, and territorial governments will work collaboratively through the Canadian Council of Ministers of the Environment and through Innovation Ministers to develop and refine ways to measure progress, including through the use of indicators and metrics. Future reports will also identify policy gaps and opportunities, and will provide recommendations on new or expanded areas of work to address them.

1 INTRODUCTION

One year ago, Canada's First Ministers committed to take further action on climate change by adopting the Pan-Canadian Framework on Clean Growth and Climate Change. The Pan-Canadian Framework recognizes the significant costs and risks associated with climate change – risks to the environment, as well as to the health, security, and future prosperity of Canadians. It also positions Canada to take advantage of the significant clean growth opportunities associated with taking action on climate change.

The Pan-Canadian Framework is built on four pillars: pricing carbon pollution, complementary actions to reduce emissions across the economy, adaptation and climate resilience, and clean technology, innovation and jobs.

Over the past year, federal, provincial, and territorial governments have worked together, as well as with Indigenous Peoples, to start implementing the measures in the Pan-Canadian Framework to reduce greenhouse gas (GHG) emissions, build resilience to the changing climate, and enable sustainable economic growth. These actions will help Canada meet or even exceed its 2030 climate change target of a 30% reduction below 2005 GHG emission levels.

In the launch of the Pan-Canadian Framework, First Ministers directed federal, provincial, and territorial governments to report annually to Canadians and First Ministers on progress achieved in order to enable governments to take stock and give direction to sustain and enhance efforts over time.

This first annual synthesis report summarizes progress made over the past year by federal, provincial, and territorial governments in implementing new actions across the four pillars of the Pan-Canadian Framework.

The structure of this report follows that of the Pan-Canadian Framework and provides:

- A high-level overview of progress on each of the four pillars of the Pan-Canadian Framework, including early actions underway and key overall accomplishments to date;
- An overview of the status of reporting and oversight mechanisms and an update on ongoing efforts to improve emissions inventories, projections, and reporting;
- Highlights of expected actions and areas of work for the year ahead; and
- An annex listing all Pan-Canadian Framework actions undertaken in the last year or currently underway by all jurisdictions.

2 PRICING CARBON POLLUTION

Carbon pollution pricing is central to the Pan-Canadian Framework given that it is broadly recognized as one of the most effective, transparent, and efficient policy approaches to reduce GHG emissions. Some provinces have already established carbon pollution pricing systems, while other provinces and territories are moving forward to design or put in place their own systems. The carbon pollution pricing benchmark established by the federal government gives provinces and territories the flexibility to implement either an explicit price-based system (i.e., a carbon tax or a hybrid system with a carbon levy and performance-based system) or a cap-and-trade system.

Significant progress has been made to implement carbon pricing in Canada. Many of these actions build on existing carbon pricing programs already in place in Canadian jurisdictions, which cover about 85% of Canada's economy and population. Economy-wide carbon pricing is in place in several provinces:

- British Columbia has North America's most comprehensive carbon tax currently at \$30/tonne and increasing by \$5 per year starting in 2018, to a maximum of \$50 per tonne, with a targeted performance-based system for industrial emitters;
- Québec had a carbon levy (2007-2015), and has also had a cap-and-trade system since 2013, which guarantees GHG reductions;
- Ontario has a cap-and-trade system (2017); and,
- Alberta extended the reach of its carbon pricing system in 2017, increasing coverage across the economy by introducing a carbon levy, to complement its intensity-based pricing system. A new output-based pricing system will be introduced in 2018.

On September 22, 2017, Ontario, Québec, and California signed an agreement **linking the carbon markets** of the three jurisdictions. This agreement integrates and harmonizes emissions cap programs, allowing entities to meet their emissions compliance obligations in a more flexible and cost-effective manner while maintaining the environmental integrity of each jurisdiction's progress.

This year, progress was made by other provinces and territories² to inform the design and implementation of carbon pricing, including stakeholder engagement to support program development:

- Nova Scotia announced an Agreement-in-Principle with the federal government on clean growth and climate change, and conducted stakeholder consultation on design options for developing a cap-and-trade program. Nova Scotia plans to develop cap-and-trade program regulations in 2018.
- Manitoba announced a Made-in-Manitoba Climate and Green Plan that includes carbon pricing.
- New Brunswick committed to introducing a carbon pricing mechanism during the current session of the legislature.
- Prince Edward Island is preparing to launch a carbon pricing mechanism in 2018.
- Newfoundland and Labrador has passed legislation for a performance-based system for large onshore industrial emitters and has put in place reporting requirements.
- Yukon is studying the impacts of carbon pricing on its residents, businesses and industry.
- The Northwest Territories (NWT) is examining an approach to implementing carbon pricing in the NWT in a manner that reflects the unique circumstances in the NWT.
- Nunavut is studying the impacts of carbon pricing on Nunavummiut.

The federal government released a technical discussion paper outlining the proposed design of the federal carbon pricing backstop system—composed of a levy and performance-based pricing system—for public comment. [The federal government also completed a study with the territories to assess potential impacts of carbon pricing and inform solutions that address their unique circumstances, including high costs of living and energy, and challenges

² While Saskatchewan and Manitoba have not endorsed the Pan-Canadian Framework, their respective actions and any collaborative efforts to address climate change are included in this report. Saskatchewan did not report on any carbon pricing measures.

with food security.] Discussions with Indigenous Peoples are ongoing to find solutions to address their unique circumstances. Federal, provincial, and territorial governments also initiated a review of approaches and best practices to address the competitiveness of emissions-intensive trade-exposed sectors.

3 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to continue taking meaningful action to reduce GHG emissions across all regions and sectors of the economy. The Pan-Canadian Framework approach complements carbon pricing by expanding and linking clean electricity systems across the country, improving the energy efficiency of vehicles, buildings, and industries, putting more zero-emission vehicles on the road, using cleaner fuels to power the economy, and reducing emissions and increasing carbon storage in the agriculture, forestry, and waste sectors. These actions will help cut emissions and will also drive clean growth by spurring development of new clean technologies and creating jobs in many sectors.

In the first year of implementation, significant progress was made to advance measures across all sectors. Funding has been announced and mobilized, and programs have been launched. Regulations are being designed, drafted, and consulted on. New programs are being established. Many of these processes can take years to initiate, but due to focused action and collaboration, work is progressing on accelerated timelines. Collaboration across jurisdictions has been very strong, with governments working together to coordinate actions to ensure long-term success. Responsibility for reporting on progress is shared across a number of federal-provincial-territorial Ministerial tables. Environment Ministers are overseeing progress on a number of key regulatory measures, including for methane, coal, and natural gas. Given that energy production and use accounts for over 80% of Canada's GHG emissions, Energy Ministers have a critical role to play, and are leading on almost half of the collaborative actions in the Pan-Canadian Framework, including on electricity, energy efficiency, and aspects of clean technology and innovation. Many of these actions build on individual and collective work by the federal, provincial and territorial governments through the Canadian Energy Strategy. Transportation Ministers have been overseeing work on important measures to help transition Canada's transportation system towards a low-carbon future, in collaboration with Energy and Innovation Ministers. Forest Ministers and Ministers of Agriculture have been overseeing mitigation actions for the forestry and agriculture sectors.

A number of jurisdictions are making investments to support action in a number of areas such as renewable energy and energy efficiency. The federal government announced billions of dollars in funding to support new investments in electricity infrastructure, transportation systems, energy efficient buildings, and forestry and agricultural projects. Discussions between federal, provincial, and territorial officials on the details of new supporting investments are well underway.

3.1 ELECTRICITY

Non-emitting electricity systems are the foundation of a clean economy. They can support emissions reductions across other sectors like transportation, industry, and buildings. Canada already has one of the cleanest electricity systems in the world and is striving to expand capacity, reduce emissions, and drive clean growth across the economy.

Federal, provincial, and territorial governments committed to work together to move away from traditional coal-fired power generation and toward renewable and non-emitting sources of energy through a combination of regulations on coal and natural gas, and investments in clean energy and supporting infrastructure. Governments also committed to help reduce reliance on diesel in partnership with Indigenous Peoples and northern and remote communities. Good progress was made in 2017 and implementation is on track. All jurisdictions took important steps in 2017 to increase the use of clean electricity, including regulatory amendments, new action plans, policies and programs, and significant new investments and construction of renewable capacity.

To accelerate the phase-out of traditional coal units across Canada by 2030, the federal government published amendments to the coal-fired electricity regulations [in December 2017]. Alberta is also working to phase out its use of coal-fired power and has negotiated agreements with coal generators to phase out coal by 2030. Draft federal regulations for natural gas-fired power *[were also published in December 2017]* with final regulations planned for 2018.

The Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI) has made important strides bringing provincial and federal governments and utilities together to identify the most promising electricity infrastructure projects. Provinces and territories are also advancing renewable electricity regulation, policies and programs to increase energy generation capacity from renewable and non-emitting energy sources. For example, Québec announced an implementation plan for its 2030 Energy Policy with a commitment to increase renewable energy generation capacity by 25 percent. Similarly, Saskatchewan is working towards achieving a target of 50 percent of total generation capacity from renewable energy sources by 2030; the province recently launched a utility-scale solar electricity generation procurement project.

Many jurisdictions committed new funds to help reduce reliance on diesel, working with Indigenous Peoples and northern and remote communities. For example, Yukon is working to implement the Independent Power Production policy by early 2018 to support the participation of independent power products and the development of environmentally sound and affordable electricity. Provinces and territories also worked together through the Pan-Canadian Task Force on Reducing Diesel Use on Off-Grid Communities to develop a common vision for remote energy use.

Announced in August 2017, the governments of Canada and Ontario are collaborating with Wataynikaneyap Power to **connect Pikangikum First Nation to Ontario's power grid**. A 117-kilometre power line from Red Lake to Pikangikum will provide clean, safe and reliable power and eliminate the community's dependence on diesel fuel. Wataynikaneyap Power is a licensed transmission company equally owned by 22 First Nation communities, working in partnership with Fortis Ontario Inc.

Alberta proclaimed the **Renewable Electricity Act** and launched the Renewable Electricity program to support the development of 5,000 megawatts of renewable electricity capacity by 2030. The province also announced \$35 million to fund Indigenous climate leadership initiatives, including renewable and solar energy projects in First Nation and Metis communities.

Newfoundland and Labrador continued work towards the completion of the **Muskrat Falls hydroelectric project**. When completed, 98% of Newfoundland and Labrador's electricity will come from renewable sources, with surpluses exported to Nova Scotia and beyond. The Holyrood Thermal Diesel Generating station, which emits over one million tonnes of GHG emissions per year, will be decommissioned.

3.2 BUILT ENVIRONMENT

Canadians spend much of their lives in buildings that require energy for heating, cooling, lighting, and other services. Designing and retrofitting buildings to use energy more efficiently and using more energy efficient appliances and equipment can cut emissions, improve comfort, increase resilience, and help save money on utility bills.

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to improve efficiency by updating building codes, labelling building energy use, investing in retrofits, and setting new standards for appliances and equipment. Supporting the building industry to increase capacity on energy efficient standards and building practices can help facilitate many of the changes needed in the building sector. Governments also committed to collaborate with Indigenous Peoples as they move to more efficient building standards.

Good progress was made in 2017, and implementation is on track. Federal, provincial, and territorial Ministers of Energy released Canada's Buildings Strategy, which includes an implementation plan for the Pan-Canadian Framework actions on the built environment.

British Columbia has a new **2017 Energy Step Code** that enables communities that opt in to gradually progress to net-zero energy ready buildings, with substantial opportunities to reduce emissions.

In addition, key funding envelopes have been announced and details are being developed, including the \$2 billion Low Carbon Economy Fund. Launched by the Government of Canada on June 15, 2017, the Fund is comprised of two parts: the Leadership Fund and the Challenge Fund. The former will support provincial and territorial actions to reduce GHG emissions and spur clean growth in various sectors of the economy and the latter will support innovative initiatives proposed by a wider range of stakeholders.

The **Green Ontario Fund** was launched in August 2017 to support the deployment of commercially available technology to reduce GHG emissions from buildings or from the production of goods. As part of Ontario's Climate Change Action Plan, it is funded by proceeds from the province's cap on pollution and carbon market. This year, the province is investing \$377 million in the Green Ontario Fund, with further investments planned for the next four years. The agency's first program, GreenON Installations, offers single-family homeowners, at no cost, the installation of a smart thermostat and advice on energy cost savings.

Efficiency requirements for new buildings are also being implemented, and retrofits are being supported through financial assistance programs, new energy benchmarking practices, and infrastructure investments. Manitoba created a new agency to promote energy conservation and efficiency. Newfoundland and Labrador continues to require that new buildings and large renovations receiving any level of provincial funding be built sustainably. Other key actions include new federal standards for heating equipment, a federal-provincial-territorial strategy for making equipment more energy efficient, and new efficiency standards for products. In order to support sustainable housing in Indigenous communities, the Government of Canada is initiating a research project through the National Research Council to define guidelines to support sustainable housing in First Nations communities.

3.3 TRANSPORTATION

The transportation sector is a major source of emissions in Canada. It accounted for nearly 24% of emissions in 2015. There are many opportunities to improve and support transport system efficiency, switch to alternative fuels, and take advantage of new vehicle technologies to achieve emissions reductions from this sector.

Federal, provincial, and territorial governments committed to modernize the transportation system through new emissions standards for vehicles, a plan for establishing retrofit requirements for heavy-duty vehicles, and a strategy to put more zero-emission vehicles on the road. Governments also committed to enhance investments in lower-emitting modes of transportation, including public transit, electric vehicle charging and alternative fuel infrastructure. In collaboration with provinces and territories, industry and other stakeholders, the federal government also set out to develop a clean fuel standard to cut emissions from fuels used in transportation, buildings, and industry.

Alberta is **supporting public transit** through a number of programs and initiatives, including a commitment of \$1.53 billion to the Calgary Green Line LRT and an additional \$176 million for a total of \$600 million to support the Southeast Valley Line LRT in Edmonton.

Implementation is on track to reduce emissions and make the transportation sector more efficient. Federal, provincial, and territorial governments are working together and have engaged with expert working groups to provide advice on the development of a national strategy for zero-emission vehicles (ZEVs). This strategy will complement and build on ongoing actions across jurisdictions, including British Columbia's Clean Energy Vehicle Program, Prince Edward Island's electric vehicle (EV) education campaign, and New Brunswick's installation of 15 new EV charging stations.

Québec is working to **increase the number of zero-emission vehicles** on the road by 2020. Proposed regulations to implement its ZEV standard, coupled with subsidies, underwent consultation in the summer of 2017.

In addition, the federal government published draft regulations to implement emissions standards for heavy-duty vehicles, and many jurisdictions are developing plans to reduce transportation emissions. The federal government has been working with provinces and territories to develop a Clean Fuel Standard framework; a discussion paper

was published this year, consultations were held, including with Indigenous Peoples, and draft regulations are expected in 2018.

3.4 INDUSTRY

Industries are the backbone of the Canadian economy but are also the largest source of emissions. From manufacturing to mining to oil and gas extraction, industries hold great potential to improve efficiency and find new and cleaner ways of operating.

Governments committed to introduce regulations to reduce methane and hydrofluorocarbon (HFC) emissions from industrial operations, help industries improve their energy efficiency, and invest in research and development (R&D) and deployment of new industrial technologies that help reduce emissions.

Implementation is on track. The federal government published draft regulations to reduce methane emissions from the oil and gas sector, and discussed approaches with Alberta, British Columbia and Saskatchewan that will allow for province-specific solutions. Draft federal regulations to phase down the use of HFCs have been published. A number of jurisdictions created or expanded industrial energy efficiency incentives, performance standards, and other supportive measures.

On May 27, 2017, the federal government published draft **regulations to reduce emissions** of methane, a potent GHG, from the oil and gas sector. The regulations aim to reduce unintentional leaks and intentional venting of methane, as well as ensuring that oil and gas operations use low-emission equipment and processes. These actions are expected to reduce GHG emissions by about 20 Mt by 2030.

Federal, provincial, and territorial governments also committed significant funds for research, development, demonstration, and deployment of new cleaner industrial technologies, including for the oil and gas sector.

Emissions Reduction Alberta (ERA)'s \$50 million Oil Sands Innovation Challenge focuses on demonstration projects that involve prototype testing, field piloting, commercial demonstration, or first-of-kind technology deployments of innovative technologies that reduce GHG emissions and improve the cost competitiveness of bitumen production and processing.

3.5 FORESTRY, AGRICULTURE, AND WASTE

Canada's forests, wetlands and agricultural soils represent a major stock of stored carbon, sequestering it from the atmosphere. Managing and expanding this stored carbon is an important part of global climate action.

Governments have committed to protect and enhance carbon sinks, increase the use of wood in construction, support innovative technologies and better practices to reduce emissions from these sectors, and work together to identify opportunities to produce renewable biofuels and bioproducts.

Implementation is on track, with investments made across jurisdictions to enhance carbon storage, protect carbon stocks in forests and agricultural soils and at the same time consider mitigation actions that could help improve sector resilience to climate change. Federal, provincial, and territorial governments are increasingly focused on exploring how forest and agriculture management practices could increase carbon sinks and reduce GHG emissions. To this end, part of the \$2 billion Low Carbon Economy Fund will be used to support eligible projects in the forestry and agriculture sectors.

British Columbia's **Forest Carbon Initiative** is a \$150-million program over five years, starting in 2017, to develop and implement forest activities such as reforestation, increased planting density, and fertilization that reduce emissions and sequester carbon in B.C.'s Crown forests. Outcomes of the initiative, depending on the portfolio mix, are estimated to be: \$26 million annually in GDP impact; 295 jobs per year over five years; and, 50,000 hectares per year treated over five years. Fully implemented, the initiative aims to deliver GHG benefits in the medium-term (2030), longer-term (2050) and beyond.

In July 2017, federal, provincial, and territorial Ministers of Agriculture reached an agreement on the key elements of Canada's new agricultural policy framework, the Canadian Agricultural Partnership, which will include programs to support clean growth and climate change as part of a \$3 billion investment. Under the Partnership, jurisdictions will make investments to enhance carbon storage in agricultural soils, generate bioproducts and biofuels, and advance research and innovation to support GHG emission reductions in the agriculture sector.

Several provincial and territorial governments have implemented actions to produce biomass/bioproducts, improve on-farm energy efficiency, and develop renewable energy through investments in clean technologies. For example, Saskatchewan continues to support improvements in farming practices that help reduce GHG emissions and enhance carbon sequestration, including precision agriculture, zero-till and manure management.

Federal, provincial, and territorial governments are also helping expand the production of bioenergy and bioproducts for multiple uses. One promising application involves helping rural and remote communities reduce reliance on diesel. Governments also continue to promote the use of wood in construction. For example, Alberta, British Columbia, Québec, and New Brunswick recently recommitted to use more low-carbon renewable materials like wood in municipal and government-funded buildings.

In the waste sector, several provincial and territorial governments are undertaking waste diversion projects, as well as projects to use wastes as fuel, for example using wood waste in cement production.

Newfoundland and Labrador continues to work with Regional Service Boards and municipalities across the province to fully implement the **Provincial Solid Waste Management Strategy**. Ongoing infrastructure investments are consolidating and closing out landfills in favour of modern facilities. Composting pilot projects have been developed in several regions of the province to help reduce methane emissions.

3.6 GOVERNMENT LEADERSHIP

Governments can help drive investment and bring new approaches and technologies to market faster by supporting new clean technology through procurement rules and policies.

Federal, provincial, and territorial governments committed to set ambitious targets for emissions reductions from government operations, cut emissions from government buildings and fleets, and scale up clean procurement.

Governments have taken action and are on track to reduce emissions from operations and expand clean procurement practices, including work on greening government operations actions plans, as described in section 5.3. British Columbia is leading the charge with its ongoing commitment to be a carbon neutral government. Alberta has committed to installing 854.7kW of solar energy on government owned buildings. Other jurisdictions are also continuing to explore opportunities to reduce emissions through the use of EVs, energy efficiency, retrofits, procuring renewable energy, and green buildings. The federal government is modernizing its heating and cooling plants, investing in renewable energy, and reducing emissions from its buildings and fleets.

In July 2017, the Government of Canada released its **federal operations GHG emissions inventory**, showing that 15 core departments and agencies have collectively reduced emissions by 19% between 2005-06 and 2014-15. The Government of Canada will continue to report publicly on progress toward reducing GHG emissions from its operations by 40% by 2030, and potentially as early as 2025.

3.7 INTERNATIONAL LEADERSHIP

Canada was instrumental in the negotiation of the historic Paris Agreement, in which countries around the world committed to take action to limit global warming to two degrees above preindustrial levels. Continued leadership and global cooperation are key to moving forward and meeting the Paris Agreement commitment to increase ambition over time.

In the Pan-Canadian Framework, the federal government reaffirmed its commitment to invest \$2.65 billion in international climate finance by 2020, to explore options with provinces and territories for the acquisition of international emissions allowances, and to collaborate with provinces and territories as well as international partners to ensure that trade rules support climate policy. The federal government also reiterated its commitment to continue to engage with and support Indigenous Peoples' action on international climate change issues. This includes work through the United Nations Framework Convention on Climate Change (UNFCCC) to formulate a platform for Indigenous Peoples, as agreed to in the Paris decision.

Implementation is on track. Of the \$2.65 billion that Canada has pledged to help developing countries transition to low-carbon, climate resilient economies, the federal government has announced more than \$900 million in funding contributions. In addition, Québec announced \$25.5 million mainly for Francophone countries that are most exposed to the impacts of climate change. Further to contributions to multilateral development banks, Canada is also providing direct support to developing countries to reduce emissions and adapt to the effects of climate change. This includes, for example, \$13 million to support climate smart agriculture development in Central America; \$39 million to help build the resilience of farming households in Senegal, with a particular emphasis on women and young people; and \$15 million to promote climate technology innovation in Vietnam.

The federal government, in consultation with provinces and territories, has been working with international partners to assess how best to design and use market and non-market mechanisms under the Paris Agreement. Québec, British Columbia, Ontario, and the State of California have demonstrated leadership through their partnership in the Western Climate Initiative, as has British Columbia through its partnership with California, Washington, Oregon and Alaska (as an observer) in the Pacific Coast Collaborative. Discussions on trade and climate policy have been initiated through the World Trade Organization and other international forums. The federal government has also begun working with Indigenous Peoples to establish a Local Communities and Indigenous Peoples' Platform under the UNFCCC, including by convening informal discussions and through formal negotiations at COP23 in Bonn, Germany.

4 ADAPTATION AND CLIMATE RESILIENCE

In the Pan-Canadian Framework, federal, provincial, and territorial governments underscored the significant risks that climate change impacts pose to communities, the health and well-being of Canadians, the economy, and the natural environment. Canada's northern and coastal regions and Indigenous Peoples are especially vulnerable. The PCF represents the first time that federal, provincial, and territorial governments have identified priority areas for collaboration to build resilience to a changing climate across the country:

- Ensuring Canadians have information and multidisciplinary expertise to consider climate change in their planning and decision-making;
- Building climate resilience through infrastructures
- Working to protect the health and well-being of Canadians;
- Supporting particularly vulnerable regions and Indigenous Peoples in addressing climate impacts; and
- Reducing the risks to communities from climate-related hazards and disasters.

For each priority area, federal, provincial, and territorial governments identified new actions that would advance efforts towards a more resilient Canada. These actions range from measures to improve access to climate science and information that supports adaptation decision-making, to investments in built and natural infrastructure to increase climate resilience in communities, to efforts that help us better understand and take action to address climate-related health risks such as extreme heat and infectious diseases.

This first year of implementation provided a solid foundation for this work, including the announcement of significant new investments in adaptation and climate resilience. New programs to support adaptation efforts are being established, codes and standards for climate resilience are under development, and initiatives to build regional capacity for adaptation action across all the priority areas have been launched.

Efforts are underway across many portfolios to advance adaptation and resilience (e.g., health, relations with Indigenous Peoples, emergency management, infrastructure, local government, natural resources, fisheries, agriculture, energy, economy and innovation). Ministers of Agriculture are advancing efforts to adapt to the impacts of climate change through the Canadian Agricultural Partnership that will build capacity in the agricultural sector while also supporting science, research and innovation. In addition, Forest Ministers are undertaking work to better combat the spread of pests that destroy forests, such as the mountain pine beetle and spruce budworm.

4.1 TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION

Understanding how the climate and the environment are changing and how future conditions will impact Canada is essential for taking action to adapt and build resilience across the country. Climate science and information and Indigenous Knowledge can inform important decisions that will help manage risks, reduce costs, and ensure society thrives in the face of a changing climate.

As the foundation for advancing adaptation in Canada federal, provincial, and territorial governments committed to improve access to authoritative, foundational climate science and information to support adaptation decision-making across the country, build regional capacity and expertise, respectfully incorporate Traditional Knowledge, and mobilize action.

To support hazard mapping activities and risk assessments in the Atlantic region, New Brunswick has made **climate change data** as well as other data to inform flood risk mapping (e.g., LiDAR) publically accessible. Nova Scotia has produced and made publicly available regional climate data and local flood risk maps to be used by planners, researchers and the public across the province. Prince Edward Island has secured federal funding approval under the National Disaster Mitigation Program to conduct a risk assessment of coastal infrastructure assets, to develop coastal hazard maps for the entire coastline, and to make the data publicly accessible.

Implementation is on track with all governments working in partnership to improve climate services in Canada, including the design phase of a Canadian Centre for Climate Services. The federal government is also working with governments and organizations to build adaptation expertise and develop regionally-specific risk assessments and adaptation information.

The **Canadian Centre for Climate Services** will deliver trusted climate information, data, and tools that will support adaptation decision-making. Training, support, and user-driven products will ensure tools are used while partnerships with other organizations will shape and deliver services across the country.

Provinces and territories have undertaken initiatives to build regional capacity for decision-making and addressing climate impacts, including providing funding for regional organizations. For example, Ontario is planning to launch a new climate change organization to ensure decision-makers have access to cutting edge, region-specific climate impact information, as well as the services required to ensure users with different levels of capacity can make use of it. Saskatchewan is funding research projects to help mitigate and enhance resilience to climate change, including research on drought resistant crops, prediction and management of pests and diseases, carbon sequestration through agronomic practices, and minimizing the vulnerability of forests to climate change.

Manitoba is providing funding support of \$400,000 for the creation of the **Prairie Climate Centre** to develop climate data to inform decision-making and address climate impacts.

The Maliseet Nation Conservation Council, with support from the federal government, is working with three Maliseet communities in New Brunswick to build resilience to climate change. The project combines **community knowledge** from traditional ecological surveys and interviews with Elders, while data from a vulnerability assessment on final strategic planning document will help the communities better prepare for climatic changes.

4.2 BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE

Designing and investing in built and natural infrastructure that can withstand and help us manage changing climate conditions is essential to the health, safety, and sustainability of our communities and economy.

Federal, provincial, and territorial governments committed to partner to invest in infrastructure projects that build climate resilience and to work together to integrate climate resilience in building design codes and guides.

Implementation is on track for 2017, with significant investments to support climate resilience through infrastructure by all levels of government. For example, a portion of the cost-shared \$9.2 billion announced by the federal government for Integrated Bilateral Agreements with provinces and territories will be invested in adaptation and climate resilience, and on a cost share basis an additional \$2 billion has been committed to a Disaster Mitigation and Adaptation Fund for large-scale infrastructure projects. This fund represents Canada's largest dedicated source of funding for built and natural, large-scale infrastructure projects designed to protect communities from natural disasters and extreme weather and build climate resilience. Manitoba is also making strategic infrastructure investments of no less than \$1 billion annually to support economic growth and improve flood protection.

Governments are also working together to build the tools to help ensure significant investments are resilient to climate change. For example, a federal-provincial-territorial Working Group is helping develop a Climate Lens to ensure climate resilience is considered for Investing in Canada Infrastructure Program and Disaster Mitigation and Adaptation Fund projects.

Research is underway to update building codes and guidance and standards are being developed to support decision-making for climate resilient infrastructure. Some provincial and territorial governments are requiring consideration of climate change impacts in infrastructure design, and undertaking initiatives to increase resilience to flooding.

Since 2008, Québec has been assessing natural risks and developing and **implementing climate change adaptation strategies** for Nunavik transportation infrastructure built on permafrost. The ongoing research projects assess the effectiveness of full-scale adaptation solutions.

More than 90% of Newfoundland and Labrador's population is situated along the coastline which is affected by storm surges and erosion. The province is enhancing its **network of coastal monitoring stations**. There are currently 116 stations in the province, including five in northern Labrador Indigenous communities. Data from these stations informs infrastructure, planning, and development decisions.

4.3 PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING

Focused efforts to address rising climate-related health risks help Canadians take action to protect themselves and prepare the health care system to deal with emerging challenges. Community-based approaches and solutions are key to the vitality and well-being of Indigenous Peoples facing unique and growing challenges related to health.

Federal, provincial, and territorial governments committed to collaborate to address climate change-related health risks, including extreme heat, and climate-driven infectious diseases, such as Lyme disease. The federal government committed to support First Nations and Inuit communities to undertake health adaptation projects and work with the Métis Nation on addressing the health effects of climate change.

The Government of the Northwest Territories has developed **public health advice to minimize health impacts** due to wildland fire smoke and a visibility index tool to estimate current air quality and identify appropriate actions. NWT has also been working to deploy portable air monitoring equipment during smoke events, and update the health and social service system's emergency response capacity and preparedness.

Good progress has been made in 2017 with federal, provincial, and territorial governments advancing efforts to reduce the harmful consequences of climate change on the health and well-being of Canadians. For example, provinces and territories have developed new heat warning thresholds, expanded Heat Alert and Response Systems for smaller communities, and advanced monitoring and awareness building of climate change impacts on health. The federal government has launched a framework and action plan on Lyme Disease that will focus on surveillance, education and awareness, as well as guidelines and best practices related to prevention, diagnosis and treatment. It is also increasing support for First Nations and Inuit communities to undertake climate change and health-adaptation projects and working with the Métis Nation to address the health effects of climate change.

As part of new federal funding for climate change health initiatives, the first call for proposals under the new **Infectious Diseases and Climate Change Fund** was issued to address the impact of climate change on human health by building and increasing access to infectious disease-based evidence, education, and awareness.

A new website, www.climate telling.info, has also been created to support Indigenous Peoples in sharing knowledge and information on climate change adaptation.

4.4 SUPPORTING PARTICULARLY VULNERABLE REGIONS

While all regions in Canada are faced with unique challenges from the impacts of climate change, the Indigenous Peoples of Canada, along with coastal and northern regions, are particularly vulnerable and disproportionately affected. Understanding climate change impacts and taking action to adapt will help the most vulnerable communities, traditional ways of life, and economic sectors thrive in a changing climate.

Federal, provincial, and territorial governments committed to invest in infrastructure to protect vulnerable regions and communities, build climate resilience in the North, support community-based monitoring by Indigenous Peoples, and support adaptation in coastal regions.

Implementation is on track for 2017. Infrastructure investments under the Investing in Canada Plan will help build resilience in vulnerable coastal and northern regions, and new and enhanced programming has been launched to support northern communities and Indigenous Peoples in monitoring climate changes, assessing impacts, and identifying adaptation solutions. Progress has been made on the development of the multi-partner Northern Adaptation Strategy that will build capacity in the North.

The governments of Canada, Yukon, the Northwest Territories, Nunavut, Québec and Newfoundland and Labrador as well as northern Indigenous organizations are collaborating to develop the **Northern Adaptation Strategy**. The Strategy, to be finalized in 2018, will set the stage for a new collaborative approach to addressing adaptation throughout the North, including identifying priorities for mobilizing action, fostering innovation to support the development of strong and resilient communities and contributing to renewed Arctic leadership.

Federal programming has been renewed to support adaptation efforts in coastal regions with credible scientific information and predictions of climate change impacts on fisheries, ecosystems and coastal infrastructure. Targeted regional efforts have been undertaken to increase resilience to flooding.

As a coastal province, Nova Scotia has focused on increasing its resilience to flooding. The province is developing new dyke standards, restoring salt marshes, and providing funds to municipalities through the **Flood Risk Infrastructure Investment Program**.

In partnership with Yukon First Nations and municipalities, Yukon is planning a new integrated strategy for energy, climate change and green economy to help enhance resilience to climate change across the territory. Yukon is also supporting monitoring and data collection at Herschel Island-Qikiqtaruk Territorial Park to document climate change impacts on the ecosystems and wildlife of this remote arctic island. The Northwest Territories has developed a Climate Change Strategic Framework and supporting adaptation by Indigenous Peoples is a key

priority for the Government of the Northwest Territories. The government is partnering with the NWT Association of Communities to facilitate adaptation efforts across the territory.

Québec, in collaboration with Kativik Regional Government and Consortium Ouranos, is developing a synthesis of **knowledge on Nunavik's projections** on sea and coastal ice, weather extreme events, storm surges and coastal risks in the context of climate change.

4.5 REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS

With climate change expected to exacerbate hazards such as floods, wildfires, drought, extreme heat, high winds, and road failures, effective disaster risk-reduction efforts and adaptation measures are key to reducing the severe negative impacts these events can have on communities and the economy.

The 2017 wildfire season in British Columbia saw an unprecedented 1,215,745 hectares burned, almost eight times the 10-year average area burned for 2006-2016. More than 65,000 people were displaced and firefighting costs exceeded \$550 million. The province has commissioned an independent review of recent events and will continue to fund community-level wildfire risk reduction and landscape-level fire management activities.

Federal, provincial, and territorial governments committed to invest in traditional and natural infrastructure that reduces climate-related disaster risks, advance efforts to protect against floods, and support adaptation in Indigenous communities facing repeated and severe climate impacts.

Implementation is on track for 2017, with billions of dollars under the Investing in Canada Plan, including the new Disaster Mitigation and Adaptation Fund, for investments in traditional and natural infrastructure to reduce climate-related hazards and disaster risks. Federal, provincial, and territorial governments have worked together on developing a Federal Floodplain Mapping Guidelines Series to help advance floodplain mapping activities across jurisdictions in Canada. A wide range of actions are also underway across many jurisdictions to address flood risks.

To enhance efforts to protect against floods, the Québec government held a **forum on flood management solutions** in October 2017. The province also started a project to help 88 coastal municipalities identify and reduce their vulnerabilities to coastal erosion and increase their resilience to climate change.

Additional targeted initiatives include federal enhancements to the First Nations Adapt program for flood mapping activities and provincial and territorial support for municipalities and communities in building long-term resilience to flooding as well as drought events, preventing coastal erosion and landslides through adaptation planning, and sharing of best practices.

In 2017, the **Alberta Community Resilience Program** awarded \$58.5 million to 25 projects in 20 municipalities and First Nation communities for the development of long-term resilience to flood and drought events. Additionally, \$4.86 million was awarded through the Watershed Resiliency and Restoration Program for 32 projects to restore and improve natural watershed functions to enhance natural resiliency to droughts and flood.

5 CLEAN TECHNOLOGY, INNOVATION AND JOBS

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to a common vision of immediate actions designed to accelerate clean growth in Canada and abroad. Collaboration led to advancements in each of the four core elements of the Pan-Canadian Framework's clean technology, innovation and jobs pillar including: building early-stage innovation, accelerating commercialization and growth, fostering

adoption, and strengthening collaboration and metrics for success. These actions will help create the conditions necessary to position Canada as a leader in the global clean economy.

To achieve this, governments are working together on a number of actions including access to capital that will help Canada's clean technology firms grow and expand through financing, and a streamlined "no-wrong door" approach to delivering client services for clean technology producers. Additional initiatives include new procurement programs aiming to promote clean technology adoption, and improved data on Canadian clean technologies. The development of "grand challenges"-type programming is another area of collaboration that focuses on accelerating efforts to solve Canada's big climate change challenges.

Innovation Ministers, along with Ministers in other areas such as Energy and Agriculture, are overseeing progress on key clean technology and innovation measures under the Pan-Canadian Framework. Innovation Ministers have also charged their officials to develop and implement a work plan to increase collaboration on clean growth. This includes sharing information and collaborating on existing and future federal, provincial and territorial initiatives for clean growth.³ In the first year of implementation, good progress was made across all clean technology and innovation measures in the Framework. Funding has been committed, partnerships are being developed, and programs are being launched.

5.1 BUILDING EARLY-STAGE INNOVATION

Canada needs a strong flow of innovative ideas to become a leader in the development and deployment of clean technologies. Government investments in clean technology research, development, and demonstration (RD&D) will most effectively help Canada meet its climate change goals, create economic opportunities, and expand global-market opportunities, while positioning the country's energy, mining, forest and agriculture sectors as leaders in the new resource economy.

Federal, provincial, and territorial governments committed to support new approaches to early-stage technology development, including breakthrough technologies, to advance research in areas that have the potential to substantially reduce GHG emissions and other pollutants. A key element of this work is supporting the development of innovative ideas to solve the big challenges Canadian communities currently face, such as reducing Canada's rural and remote communities reliance on diesel as a power source.

Strong progress was made in 2017 and key initiatives are on track. Governments are implementing individual measures and at the same time working together through the Federal-Provincial-Territorial Working Group on Clean Growth to collectively identify specific technology "missions" or "challenge" areas that could inform new initiatives to help solve Canada's big challenges and accelerate clean energy innovation.

The Government of Ontario created a "Grand Challenge" initiative, the **Ontario Solutions 2030 Challenge**, a global call for innovators to propose their solutions to help Ontario industry reduce GHG emissions. The Challenge will support a winning team to bring their transformative technology to market. Phase one of the challenge is currently underway.

In addition, the Government of Canada allocated \$200 million in Budget 2017 to support clean technology research, development, and demonstration in Canada's natural resources sectors. As part of this, the \$155 million Clean Growth in Natural Resource Sectors Program focusing on the energy, mining, and forestry sectors was launched in October 2017. Project co-funding with provinces and territories is a requirement under this program. Projects are anticipated to be announced in 2018.

5.2 ACCELERATING COMMERCIALIZATION AND GROWTH

Canada's success in the clean technology marketplace requires globally competitive talent, access to the capital and resources needed to demonstrate the commercial viability of products, and strong international networks that

³ The Federal-Provincial-Territorial Working Group on Clean Technology, Innovation and Jobs was one of four Federal-Provincial-Territorial Working Groups mandated by First Ministers to present options to act on climate change and enable clean growth.

facilitate the cross-border flow of clean technology goods and services. Streamlining and integrating access to support programs and services is also a priority, and essential to building commercial capacity.

Federal, provincial, and territorial governments committed to work together to improve access to government programs, increase support to advance and commercialize innovative technologies, and strengthen support for skills development and business leadership. Governments also committed to collaborate on expediting immigration processes for global talent and highly qualified personnel, promoting exports of clean technology goods and services, and playing a leadership role in international standards-setting processes for new clean technologies.

Implementation of these and other initiatives is well on track for 2017. Governments are working together to create a coordinated “no-wrong door” approach to supporting Canadian clean technology businesses and ensuring full and effective access to relevant government programs and services. For example, Québec and the federal government partnered to offer services through specific portals namely, the Entreprises Québec and Infos Entrepreneurs, to address the needs of entrepreneurs.

Federal, provincial, and territorial governments are also working together to enable access to capital for clean technology businesses to help bring their products and services to market. In its 2017 budget, the Government of Canada allocated \$1.4 billion to the Business Development Bank of Canada and Export Development Canada to support the growth of Canada’s clean technology firms through project financing. An additional \$400 million committed through the Sustainable Development Technology Canada (SDTC) will support clean technology producers in building commercial and export capacity and position Canada as a global leader in the commercialization of clean technology. A framework to guide Canadian clean technology firms’ access to capital is being finalized and new projects continue to be evaluated. Companies have also begun to access the new SDTC funding.

Several provinces and territories are also partnering with new federal funding to leverage and maximize outcomes for clean technology producers. For example, the Government of British Columbia and the Government of Canada have established a \$40 million partnership between the Innovative Clean Energy Fund and SDTC to support the development of pre-commercial clean energy projects and technologies. The funding available through this joint fund will leverage federal, provincial, territorial and private sector investments.

Nova Scotia and the Atlantic Canada Opportunities Agency (ACOA) provided funding to support start-ups through six **business acceleration programs** that will be delivered this fall, including a new competition to find innovative ways to address problems in the ocean sectors.

A number of provincial governments are also developing strategies to address skills shortages in specific industries. In addition, the federal government has launched a new Global Skills Strategy to support employers in attracting top talent and new skills to Canada. To support clean technology exports and access to global markets, the federal government is implementing an international business development strategy for clean technology. New funding has been allocated to the Standards Council of Canada to support efforts related to international standards-setting.

Saskatchewan is demonstrating global leadership through the transfer of Carbon Capture and Storage (CCS) knowledge and through collaboration with the International Standards Organization in the **development of international standards for CCS** to accurately measure, monitor and verify emission reductions by CCS projects.

5.3 FOSTERING ADOPTION

Support for domestic adoption of Canadian clean technologies is needed for Canada to achieve its climate change goals, build climate-resilient infrastructure, and create a strong domestic clean technology market. This will also help lay a solid foundation of support for Canadian clean technology firms heading to global markets.

Federal, provincial, and territorial governments committed to foster the adoption of clean technology through leading by example as early adopters of clean technology and serving an essential role as a first or “reference customer” for Canadian clean technology goods, services and processes.

Innovative Solutions Canada, a \$50 million new innovation procurement program, was launched in the fall to enhance early stage clean technology R&D, including clean technology innovation through the development and validation of novel products and services from Canadian innovators and entrepreneurs.

Governments also committed to working together to support Indigenous Peoples and northern and remote communities in adopting and adapting clean technologies and ensuring business models support community ownership and operation of clean technology solutions to reduce reliance on diesel.

Implementation of initiatives is on track for 2017. Work is underway by federal, provincial, and territorial governments to develop action plans for greening government operations and encourage utilities and municipalities and other public sector entities to adopt clean technologies to lead by example. The Government of Canada’s Greening Government Operations Centre is taking steps to support technology adoption that makes government procurement an essential first deployment/ reference market for new technology. Federal and provincial governments also supported visible and effective certification programs (e.g. ENERGY STAR) and other programs to ensure consumer and business confidence, support green procurement, and the adoption of clean technology.

5.4 STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS

An effective strategy to clean technology development, commercialization, and adoption in Canada requires coherent, collaborative, and focused approaches.

Under the Pan-Canadian Framework, federal, provincial, and territorial governments committed to work together to enhance policy and program alignment across jurisdictions and institutions and to establish a clean technology data strategy.

In 2017, good progress was made and implementation is on track. The Government of Canada announced the creation of the Clean Growth Hub to streamline client services, improve federal program coordination, enable tracking and reporting on clean technology results across government, and connect stakeholders to international markets. The Clean Growth Hub is focussing efforts on program coordination, engaging federal partners and consulting stakeholders, including provinces and territories.

Federal, provincial and territorial also undertook concrete action to build better clean technology data capacity and potential, as well as clear metrics for tracing the impact of government activities. The Government of Canada committed \$14.5 million to develop a clean technology data strategy to ensure the alignment and integration of data collection and reporting activities to foster consistent, complementary and comparable information on the Canadian clean technology economy. The federal-provincial-territorial working group undertook consultations with provinces, territories, industry and other stakeholders to advance the development of the clean technology data strategy. The first release of national data by Statistics Canada, in fall 2017 [tbc], provided for the first time a comprehensive snapshot of the clean technology economy.

Under the Ontario-Québec Joint Work Plan on Economic Development Through Climate Change Innovation, the two provinces joined forces with Statistics Canada and the sub-committee on the federal clean energy technology strategy, namely to identify issues related to defining the clean technologies sector for the compilation of statistics.

6 REPORTING AND OVERSIGHT

MEASUREMENT AND REPORTING ON EMISSIONS

Under the Pan-Canadian Framework, federal, provincial and territorial governments committed to collaborate through the Canadian Council of Ministers of the Environment (CCME) to track and report GHG emissions in a consistent way across the country, to monitor progress of the Pan-Canadian Framework, and to support international reporting obligations. In 2017, good progress was made in all of these areas. To increase consistency across emissions inventories and GHG emissions reporting, CCME explored opportunities for greater alignment on GHG emissions reporting standards and requirements across various sectors of the economy. While governments are already aligned in some areas, they will continue to explore options for achieving greater consistency of emissions inventories and tracking. CCME also undertook to improve projections of future GHG emissions. In particular, CCME is developing best practices and guidelines on modelling technological change. This guidance will help increase alignment and improve consistency across jurisdictions in this area. Federal, provincial, and territorial governments have also committed to examining options for a pan-Canadian GHG offsets framework to develop best-practices in offset system design to support creation of verified carbon credits that can be traded domestically and internationally. To this end, CCME completed extensive stakeholder engagement and identified areas to support the development of this framework.

REPORTING ON IMPLEMENTATION

The implementation of the Pan-Canadian Framework is a collaborative effort and a shared responsibility of federal, provincial and territorial governments. A governance structure has been established to support intergovernmental coordination on Pan-Canadian Framework implementation and reporting. Nine federal-provincial-territorial Ministerial Tables are responsible for coordinating Pan-Canadian Framework actions that fall within their respective Ministerial portfolios, including Environment, Energy, Infrastructure, Transport, Forestry, Agriculture, Innovation, Emergency Management and Finance. Four Ministerial Tables (CCME, Energy, Innovation, and Finance) are mandated to provide strategic analysis and oversight for each of the Pan-Canadian Framework pillars. A new Federal-Provincial-Territorial Coordinating Committee of Experts has been established to develop the annual Synthesis Report to First Ministers that integrates Pan-Canadian Framework-related input from federal-provincial-territorial Ministerial Tables. The Intergovernmental Affairs Deputy Ministers plays a key role in finalizing and delivering this annual report to the First Ministers.

This first annual Synthesis Report to First Ministers focuses on tracking progress in establishing governance structures, mobilizing funding and initiating programs and regulations. The focus of subsequent reports will shift toward concrete results and outcomes to track collective national results and progress in implementing the Pan-Canadian Framework. In order to facilitate robust and coordinated reporting going forward, over the coming year federal, provincial, and territorial governments will work collaboratively through the Canadian Council of Ministers of the Environment to identify appropriate ways to track progress on the Pan-Canadian Framework. These efforts may be informed by other initiatives underway, including the Expert Panel on Climate Change Adaptation and Resilience Results, which will provide advice to the federal government on measuring progress on adaptation and climate resilience in March 2018, as well as the work of a federal-provincial-territorial working group currently undertaking consultation to advance the development of the clean technology data strategy. Future reports will also identify policy gaps, implementation challenges and opportunities and provide recommendations on how to address them.

ANALYSIS AND ADVICE

Governments have committed to engaging experts to ensure that actions taken are effective and that decision-making is informed by science and evidence. In the coming months, the Government of Canada will engage provinces and territories on options for expert engagement, as committed to under the Pan-Canadian Framework, to support analysis and the provision of advice to promote clean growth and address climate change in Canada.

REVIEW

Federal, provincial and territorial governments will work together to establish the approach to the review of carbon pricing, including expert assessment of stringency and effectiveness that compares carbon pricing systems

across Canada, which will be completed by early 2022 to provide certainty on the path forward. As an early deliverable to the interim review in 2020, work was initiated to examine approaches and best practices to address the competitiveness of emissions-intensive and trade-exposed sectors.

COMMITMENT TO CONTINUE TO ENGAGE AND PARTNER WITH INDIGENOUS PEOPLES

First Ministers directed federal, provincial, and territorial governments to work together to report on the implementation of the Pan-Canadian Framework, engaging with relevant ministerial tables, and with meaningful involvement of Indigenous Peoples. Federal, provincial, and territorial governments will continue to engage and partner with Indigenous Peoples as actions are implemented and progress is tracked. The Government of Canada is collaborating with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation and partnership. These tables will provide a structured, collaborative approach for ongoing engagement with Indigenous Peoples in the implementation of the Pan-Canadian Framework and on broader clean growth and climate change priorities. This will help ensure that Indigenous Peoples are full and effective partners in advancing clean growth and addressing climate change.

7 LOOKING AHEAD

One of the objectives of reporting annually on Pan-Canadian Framework implementation is to facilitate an assessment of policy gaps and recommend further action in order to increase ambition over time. At this early stage of implementation, many programs, investments and regulations are still in the process of being designed and developed. Since assessing gaps first requires an evaluation of results and outcomes, this will be a feature of future reports, once data can be reported against indicators and attributed to Pan-Canadian Framework actions. In some cases, this may take time. For example, assessing the impact of policies on reducing GHG emissions will occur further in the future due to the lag between policy action and behaviour change, as well as the lag between actual emissions and the publication of emissions numbers.

PRICING CARBON POLLUTION

While most provinces and territories that do not currently have carbon pricing system in place have demonstrated a commitment to implement carbon pricing, some have not yet identified which carbon pricing system will be applied in their jurisdiction. This will be important to ensure that jurisdictions are in a position to have pricing systems take effect in 2018. Communicating program design details in a timely manner is also key to providing consumers and investors with the clarity needed to inform choices and support Pan-Canadian Framework goals of reducing GHG emissions while growing our economy.

Moving forward, work will continue towards implementing carbon pricing systems across Canada in 2018. As affirmed in the Vancouver Declaration and reiterated in the Pan-Canadian Framework, provinces and territories continue to have the flexibility to design their own policies to meet emissions-reduction targets, including carbon pricing, adapted to each province and territory's specific circumstances.

The federal government will also engage with provincial and territorial governments and stakeholders to ensure that emissions from commercial inter-provincial/territorial aviation could be properly covered.

Overall, as jurisdictions move forward with implementing carbon pricing systems, it will be beneficial to share lessons learned.

COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

It will be important to continue cross-jurisdiction collaboration as measures are developed and implemented. For example, on zero-emission vehicles, federal, provincial, and territorial governments are working together to

develop a national strategy. Developing policies together helps ensure new and existing policies are complementary. Federal, provincial, and territorial governments will work to identify additional opportunities for linking and aligning new and existing work across jurisdictions.

Key regulatory milestones over the coming year include publishing final regulations to phase out emissions from coal-fired electricity, for natural gas-fired electricity, to cut methane emissions from the oil and gas sector, and for heavy-duty vehicles, as well as draft regulations for the clean fuel standard. A range of other initiatives will be advanced over the coming year, including energy efficiency standards and related work for buildings, industrial energy efficiency programming, developing an approach to improve efficiency in the off-road sector, establishing technology funding programs, and finalizing investments in renewable energy, electricity transmission and smart grid projects. Work will also continue with negotiations under the Paris Agreement, including developing robust guidance under Article 6 for the use of international carbon markets

Federal, provincial, and territorial governments will continue to work together and discuss key Pan-Canadian Framework initiatives that require ongoing pan-Canadian collaboration, including on electricity interconnections, building codes, the ZEV strategy, and a range of investments. Federal, provincial, and territorial governments will also finalize the terms of \$9.2 billion for green infrastructure (including support for electricity infrastructure, renewable energy, and other projects) and the Leadership Fund portion of the \$2 billion Low Carbon Economy Fund.

The Government of Canada is working in partnership with the Assembly of First Nations (AFN), Inuit Tapiriit Kanatami (ITK), and the Métis National Council (MNC), to establish the three distinctions-based senior bilateral tables for ongoing engagement with First Nations, Inuit, and the Métis Nation in the implementation of the Pan-Canadian Framework and on broader clean growth and climate change priorities. In October, 2017, Canada and the AFN held the first bilateral meeting of their Joint Committee on Climate Action; Canada continues to work in partnership with ITK and MNC to establish their respective bilateral tables and plans to hold inaugural meetings with Inuit and the Métis Nation by the end of 2017.

ADAPTATION AND RESILIENCE

Over the coming year, efforts will continue to focus on launching new programs and operationalizing planned initiatives. Key milestones include the launch of the Canadian Centre for Climate Services and the Disaster Mitigation and Adaptation Fund, including identifying projects for the first round of funding, approval of integrated bilateral agreements with provinces and territories for infrastructure investments, and finalizing the Northern Adaptation Strategy. Efforts will continue to better understand and track the impacts of climate change on health and well-being and to develop innovative solutions to reduce these climate-related health impacts, as well as to support capacity building for Indigenous Peoples to address a wide range of climate change adaptation challenges.

It will be important to ensure that the Pan-Canadian Framework continues to draw on work from other existing federal-provincial-territorial working groups to link adaptation work that is ongoing and planned across each of the Ministerial tables.

Potential future collaborative work to advance adaptation and resilience across Canada could include:

- Identifying potential for integration of adaptation and GHG mitigation objectives;
- Looking at ways to increase the climate resilience of government institutions (e.g., sharing best practices, lessons learned, international examples);
- Developing guidance or sharing best practices and, information approaches for investments in resilient infrastructure, including natural infrastructure; and
- Working on climate change adaptation in coastal regions (e.g., developing a coastal adaptation strategy; sharing tools, information, approaches, best practices; compendium of tools).

Ministers of the Environment will continue to champion adaptation efforts within federal, provincial, and territorial governments, and engage all Ministers (e.g., health, relations with Indigenous Peoples, emergency management, infrastructure, local government, natural resources, forests, agriculture, fisheries, energy, economy and innovation) to take action to adapt and build resilience, as adaptation involves the mandates of these Ministerial tables. This includes encouraging all levels of government, businesses, communities and citizens to take action to identify climate change as a priority for urgent and sustained action to ensure that climate risks are being considered, and addressing those risks across sectors, jurisdictions and communities across Canada. By continuing to support and mobilize action broadly across all sectors and regions, federal, provincial, and territorial governments will work to increase Canadians' resiliency to the impacts of climate change now and in the future.

CLEAN TECHNOLOGY, INNOVATION AND JOBS

The Federal-Provincial-Territorial Working Group on Clean Growth has identified the following future opportunities to deepen engagement on clean technology innovation:

- Ensuring access to financing for smaller companies to mature and access larger scale funding later on will maximize and complement the suite of clean technology funding already available.
- Further deepen and strengthen governments' alignment efforts to fully realise the opportunities created through support for Canada's clean technology sector.
- Continue work to better understand and overcome the barriers faced by Indigenous Peoples in accessing the full suite of federal funding.
- Additional collaboration to support the development of the skills necessary to successfully integrate a low-carbon economy. This includes general innovation and entrepreneurial skills, such as increasing the awareness and knowledge by youth of the business skills required to lead a tech start-up.
- Continue work to help Indigenous Peoples overcome barriers in accessing the full suite of federal funding.
- Explore creation of a regulatory sandbox – a safe space for businesses to test innovative products in a live environment without being fully subject to regulations.

Innovation Ministers will continue collaborative efforts to ensure an effective implementation of clean technology investments and initiatives that aligns with program and policies to maximize clean technology outcomes. As implementation advances, there will be additional opportunities for the Federal-Provincial-Territorial Working Group on Clean Growth to utilize its influence and expertise in playing a pivotal role to advance Canada's clean-technology landscape.

Over the coming year, work will continue across a number of areas, including implementing federal funding support for clean technology research, and the development, demonstration and adoption of clean technology in Canada's natural resources sectors through the selection of projects. Innovation initiatives will continue to be developed and rolled out and Sustainable Development Technology Canada will continue to select and announce projects. Provinces and territories will formalize partnerships with the federal government regarding the access to capital support as well as the Sustainable Development Technology Canada funding. The first round of challenges is planned for the new federal innovation procurement program. As well, the Federal-Provincial-Territorial Working Group on Clean Growth will continue to develop a procurement resource toolkit for municipalities, universities, school and hospitals to help them leverage existing green procurement initiatives or adopt similar practices. Work will also continue to support certification programs such as the ENERGY STAR program. To implement the Clean Growth Hub, a central office will be established to improve client service. As well, to support the clean technology data strategy work will include continuing consultations, deepening metrics and annual data reporting.

ANNEX I: STATUS OF ALL PAN-CANADIAN FRAMEWORK ACTIONS

PRICING CARBON POLLUTION

Canada

In 2017, Canada began the implementation of the pan-Canadian approach to pricing carbon pollution through the:

- Release of the Government of Canada's Technical Paper on the Proposed Federal Carbon Pricing Backstop (May 18, 2017) for public comment;
- Publication of additional guidance on the pan-Canadian carbon pollution pricing benchmark (as follow up to the announcement on October 3, 2016);
- Provision of ongoing technical support to provinces and territories currently without carbon pricing systems such as modelling expertise, as requested;
- Completion of a study with the territories to find solutions that address their unique circumstances, including high living expenses and of high cost of energy, challenges with food security, and their emerging economies;
- Ongoing discussions with Indigenous Peoples to find solutions that address their unique circumstances; and
- Initiation of a review to assess approaches and best practices to address the competitiveness of emissions-intensive trade-exposed sectors.

British Columbia

British Columbia's carbon tax, in place since 2008 and currently set at \$30/tonne CO₂e, will increase by \$5/tonne per year starting April 1, 2018. BC will take measures to expand carbon pricing to include fugitive emissions and emissions from slash-pile burning.

Alberta

Alberta extended the reach of its carbon pricing system this year to increase coverage across the economy. Starting on January 1, 2017 a carbon levy applies to transportation and heating fuels that emit GHG emissions when combusted. The levy rate is currently \$20/tonne and will increase to \$30/tonne in 2018. Alberta's current Specified Gas Emitters Regulation will be also replaced in 2018 by an Output Based Allocation framework for large industrial emitters, which will regulate GHG emissions while protecting the competitiveness of Alberta's trade exposed industries.

Manitoba

Manitoba has proceeded with developing a Made-in-Manitoba Climate and Green Plan that includes carbon pricing and specific priorities for addressing climate change, jobs, nature, and water.

Ontario

Ontario launched a cap-and-trade program in January 2017 and held its first auction of emission allowances in March. Ontario's cap-and-trade regulations cover about 82% of emissions (including industry, electricity and fuels, excluding marine and aviation).

Québec

In 2013, the Québec government replaced its carbon levy with a cap-and-trade system that has been linked with California's system since 2014. During the first two years of the program, industrial emitters and electricity producers were covered. In 2015, the Québec government terminated its carbon levy, when fuel distributors became covered by the cap-and-trade system. By the end of 2017, Québec and California will have held a total of thirteen joint auctions of GHG emission allowances. Ontario is also committed to join, and by 2018, the three governments are expected to have completed the necessary steps to link their cap-and-trade systems.

Nova Scotia

In November 2016, Nova Scotia announced an Agreement-in-Principle with the federal government on clean growth and climate change. In March of 2017, Nova Scotia conducted stakeholder consultation on cap-and-trade design options, and continues to draft quantification,

reporting and verification (QRV) regulations. Nova Scotia plans to develop cap-and-trade program regulations and launch the QRV program in 2018.

<i>New Brunswick</i>	New Brunswick committed to introducing a carbon pricing mechanism during the current session of the legislature.
<i>Prince Edward Island</i>	Prince Edward Island is evaluating carbon pricing mechanisms to determine which approach best meets provincial objectives. Feedback was solicited during provincial pre-budget consultations. A mechanism will be chosen in late 2017. Required legislation and program delivery tools will be prepared in 2018. The carbon pricing mechanism will be launched in 2018.
<i>Newfoundland and Labrador</i>	Newfoundland and Labrador began operationalising its <i>Management of Greenhouse Gas Act</i> , which provides a legislative framework to reduce GHG emissions from large industrial emitters. Newfoundland and Labrador's GHG Reporting Regulations were gazetted on March 7, 2017 and Administrative Penalty regulations on July 28, 2017. Large industrial facilities were required to report their emissions to the provincial government on June 1, 2017 and provide third party verifications by September 1, 2017. Moving forward, Newfoundland and Labrador will continue to develop further regulations to support the full implementation of the Act.
<i>Yukon</i>	Yukon has been working closely with the federal government to study the impacts of carbon pricing on its residents, businesses and industry, and how best to recycle revenue.
<i>Northwest Territories</i>	The Northwest Territories released a Carbon Pricing Discussion Paper in July 2017 and held public consultations from July to September 15, 2017. The Government of the Northwest Territories will use the input received to inform the design of a carbon pricing system and determine revenue recycling options. Once the carbon pricing system is determined, the next steps will include necessary legislation.
<i>Nunavut</i>	Nunavut has been working closely with the federal government to study the impacts of carbon pricing on Nunavummiut. The study will support Nunavut's policy decisions on carbon pricing and is expected to be complete in fall 2017.

MITIGATION

ELECTRICITY

Increasing renewable and non-emitting energy sources

The federal government published draft regulations for the accelerated **phase-out of coal-fired power** by 2030, as well as natural gas fired electricity performance standards. Negotiations are ongoing between federal, provincial, and territorial governments on equivalency.

Most provinces and territories advanced plans to **increase clean electricity production**, including new efficiency regulations in British Columbia, new programs and a renewable energy auction launched in Alberta, a new energy policy and action

plan in Québec that aim to expand renewable energy, an enhanced net metering framework in Ontario, new plans to expand renewable energy in Saskatchewan, a new small-scale renewables program in New Brunswick, upgraded transmission lines to support wind power in Prince Edward Island, continued expansion of hydro in Newfoundland and Labrador and Manitoba, new efficiency investments and renewable energy R&D advancements in Nova Scotia, new work on power generation policy in Yukon, a new net metering policy in Nunavut, and a new draft energy strategy in Northwest Territories.

Good progress is being made on negotiating the terms of \$9.2 billion in federal transfers to provinces and territories for green infrastructure, a portion of which will support clean electricity infrastructure.

The federal government committed \$200 million to deploy emerging renewable energy technologies; a call for proposals will occur in late 2017 and the program will start in April 2018.

Connecting clean power with places that need it

Federal infrastructure funding will support **grid infrastructure**. Provinces and territories will receive \$9.2 billion through Integrated Bilateral Agreements for priority green infrastructure projects, which could include better-connected electricity systems. At least \$5 billion will be available through the Canada Infrastructure Bank over the next 11 years for green revenue generating infrastructure projects that are in the public interest, including those that reduce greenhouse gas emissions, deliver clean air and safe water systems, and promote renewable power.

Under the Government of Canada's Regional Electricity Cooperation and Strategic Infrastructure Initiative (RECSI), federal, provincial, and territorial governments and utilities are collaborating on regional studies to identify the most promising electricity infrastructure projects with the potential to achieve significant emissions reductions. Key projects include natural gas sector electrification in British Columbia, new non-emitting generation projects, and enhancement of transmission interties between jurisdictions.

Ontario and Québec, and Manitoba and Saskatchewan, respectively, have signed agreements to increase energy transmission across provincial boundaries.

Modernizing electricity systems

The federal government committed \$100 million for **smart grid** deployment and demonstration; a call for proposals will occur in late 2017 and the program will start in April 2018.

Alberta is studying how to integrate more small-scale generation into its grid. Ontario is looking to expand its Smart Grid Fund and is also supporting microgrid demonstration projects. New Brunswick is looking to deploy advanced metering infrastructure. Prince Edward Island is studying how to maximize benefits from renewable generation, and Atlantic Provinces announced the Atlantic Clean Energy Partnership to enhance electricity infrastructure in the region.

Reducing reliance on diesel working with Indigenous Peoples and northern and remote communities

The federal government has allocated \$220 million to fund projects that help reduce reliance on diesel; a call for proposals will occur in late 2017 and the program will start in April 2018. One of the challenges launched under the Clean Technology Stream of the Impact Canada Initiative will also support northern and remote communities to reduce their reliance on diesel.

The provincial-territorial Pan-Canadian Task Force on Reducing Diesel Use on Off-Grid Communities met to develop a common vision for remote energy use and recommended federal, provincial, and territorial collaboration to find common solutions.

Alberta announced \$35 million to fund community and solar energy projects in Indigenous communities. British Columbia is working with remote and off-grid communities to assess options. Manitoba is expanding geothermal and biomass in northern communities. Northwest Territories is setting a target for reducing diesel use and is working to expand solar and wind in remote communities. Nunavut is actively exploring opportunities for improving the energy efficiency of its diesel generators. Yukon is supporting its First Nations and communities improve energy efficiency and expand renewable energy.

BUILT ENVIRONMENT

Making new buildings more energy efficient

The federal government allocated \$99 million to develop **net-zero energy ready** building codes, including funding for RD&D projects. A number of provinces took steps to increase energy efficiency requirements for new buildings, including a new voluntary step-code in British Columbia, building code updates in Manitoba, adoption of the National Building Code by Prince Edward Island, and proposed coordination on codes and standards with British Columbia and California, Oregon and Washington. Alberta is undertaking a feasibility study to ensure that sustainable technologies are applied to new-build and retrofit projects to reduce emissions.

Retrofitting existing buildings

Most jurisdictions are **supporting energy efficiency** through policies, programs or incentives. The governments of the Atlantic provinces announced the Atlantic Clean Energy Partnership, which will promote energy efficiency, among other priorities. New Brunswick continues to invest in energy efficiency programs, including a retrofit program for low-income earners. Newfoundland and Labrador allocated \$5 million for a Home Energy Savings Program and \$4 million for a Home Energy Efficiency Loan Program. Prince Edward Island continues to offer programs to help Islanders reduce energy consumption, and is developing a district heating system. Manitoba is establishing a new crown corporation to deliver energy efficiency programs and services.

The federal government allocated \$82.5 million to support energy **benchmarking, standards and labelling**. Federal, provincial, and territorial governments are working together to develop a national framework and online tool for measuring and sharing energy use data. Ontario has introduced new reporting and benchmarking rules for energy and water. It is also working to build programs to help hospitals, universities and colleges retrofit their facilities with energy efficient and renewable energy technologies. British Columbia plans to implement new performance standards to meet new energy efficiency targets.

Federal, provincial, and territorial governments are working together to identify building retrofit projects as part of the \$2 billion Low Carbon Economy Fund. Governments are also finalizing details of \$9.2 billion in federal transfers as part of the Investing in Canada Infrastructure Program, a portion of which will support efforts to increase energy efficiency in new and existing public infrastructure.

Ontario announced a partnership with the Integrated Electricity System Operator's Conservation Fund for an assortment of projects, from fuel cells for space and water heating to net-zero energy buildings. Ontario is also supporting the MaRS Discovery District in piloting the Green Building Certifications Inc.'s Investor Confidence Project

protocols in the province and exploring how they can be adapted for the Canadian Market. Alberta is investing in government-owned building refits to increase the efficiency of mechanical and electrical equipment. Where feasible, solar panels are also being installed as part of the refit project to reduce demand on the electricity grid. The province also has approved a solar program for schools across the province.

Québec extended the RénoVert tax credit for an additional year, which will support household investments in the environmentally friendly home renovation sector and, as a result, increase demand for products and construction materials that meet recognized environmental and energy efficiency standards.

Improving energy efficiency for appliances and equipment

Federal, provincial, and territorial Energy and Mines Ministers released a strategy that sets **energy performance goals** for windows, space and water heating. Roadmaps will be developed for these goals in 2018.

The federal government amended the *Energy Efficiency Regulations*, updating **efficiency standards** for 20 product categories, with further updates for 17 more products expected in early 2018. British Columbia took regulatory action to allow utilities to increase incentives for high-efficiency equipment and also took steps to enhance standards for gas fireplaces and heat pumps. Ontario continued to update and set new efficiency standards for products. Québec tightened its energy efficiency standards for appliances. The federal government allocated \$6 million annually to support energy efficiency standards and the ENERGY STAR program for equipment.

Supporting building codes and energy efficient housing in Indigenous communities

The Government of Canada is planning a joint research project with the National Research Council to define guidelines to support **sustainable housing** in First Nations communities. Northwest Territories has committed over \$2.7 million to provide energy efficiency programs and services to residents, businesses and communities.

TRANSPORTATION

Setting standards and improving efficiency

The federal government continues to implement **emissions standards for new light- and heavy-duty vehicles**. In March 2017, draft amended regulations to implement emissions standards for heavy-duty vehicles were published in the *Canada Gazette, Part I*.

The federal government has made significant investments for transportation initiatives, such as in fuel-efficient tire standards, freight best practices, and the National Trade Corridors Fund (NTCF) for infrastructure to help reduce congestion and idling.

Canada is also taking action to improve efficiency and support fuel switching in the rail, aviation and marine sectors. This includes voluntary action plans to reduce GHG emissions and increase engine efficiency in the rail and aviation sectors.

Canada is also working to reduce aviation-related emissions by implementing the internationally agreed carbon dioxide (CO₂) standard, working with international partners to finalize a revised non-volatile particulate matter (nvPM) standard, and to finalize and implement the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Jurisdictions are taking collective action on a path forward for establishing retrofit requirements for heavy-duty vehicles. This year the federal government initiated preliminary research and analysis, which builds upon existing provincial and

territorial efforts in their own jurisdictions. Federal, provincial, and territorial governments are developing a work plan to consider options for encouraging greater use of fuel saving devices. In 2017, New Brunswick's climate change action plan recognized heavy-duty vehicle retrofits as an action that will contribute to emission reductions, while Ontario and Québec announced funding for programs that support the adoption of fuel-saving devices.

A number of jurisdictions also took action to improve efficiency and support fuel switching in the rail and marine sectors.

Many other governments continued their work to reduce emissions from the transportation sector, including Québec's regulation respecting GHG emissions for motor vehicles, British Columbia's 10-year transportation plan and increased provincial funding for transit, and Prince Edward Island's Enhancing Active Transportation Networks program and Sustainable Transportation Committee.

Putting more zero-emission vehicles on the road

A Federal-Provincial-Territorial Steering Group is overseeing the development of a Canada-wide **strategy for zero-emission vehicles (ZEVs)**. Together, governments have established several collaborative expert groups to provide advice on the development of a national strategy, expected to be finalized in 2018.

British Columbia launched clean energy vehicles (CEV) charging infrastructure subsidy programs and a procurement program for electric vehicle (EV) charging stations. BC is also enabling utilities to invest up to \$330 million to provide incentives for natural gas use in the heavy duty vehicle sector, including renewable natural gas and refueling infrastructure in the marine sector. Alberta is looking into barriers to ZEV adoption. Manitoba is expanding the use of electric buses. Ontario continues to expand its suite of ZEV incentive, information and pilot programs. Québec tabled draft regulations for a ZEV standard and has set a target to put 100 000 ZEVs on the road by 2020. New Brunswick installed 15 new EV charging stations and 10 fast chargers. Prince Edward Island purchased the first EV for its government fleet, and is in the midst of an education campaign on the benefits of EVs. Newfoundland and Labrador released a Vehicle Efficiency and Cost Calculator to inform consumers about the costs and benefits associated with purchasing a fuel efficient and alternatively powered vehicle.

The federal government allocated \$62.5 million in Budget 2016 (Phase 1) and \$120 million in Budget 2017 (Phase 2) to support the deployment, demonstration, and development of enabling codes and standards for recharging and alternative fuels infrastructure. By March 2018, Phase 1 will be complete, resulting in the construction of over 100 new EV fast chargers, seven natural gas stations, and three hydrogen stations. It will also result in the demonstration of more than 200 next-generation EV charging stations in real-world settings, including public transit, passenger and heavy-duty vehicles, multi-unit residential building and wireless charging applications.

Shifting from higher- to lower-emitting modes and investing in infrastructure

Québec, Ontario, New Brunswick, Alberta, and British Columbia developed action plans that incorporate commitments and/or funding for infrastructure improvements that facilitate efficient multi-modal transportation or ensure transportation infrastructure is resilient and adapted to the effects of the changing climate. Nova Scotia, New Brunswick, Manitoba, and Québec have signaled their commitment to electrifying transportation.

British Columbia developed a 10-year transportation plan and increased funding for transit; Alberta committed \$1.53 billion to the Calgary Green Line LRT, an additional

\$176 million for a total of \$600 million to support the Southeast Valley Line LRT in Edmonton as well as \$305 million for municipal transit; and Prince Edward Island is expanding its sustainable and active transportation infrastructure.

The Public Transit Infrastructure Fund is investing \$3.4 billion over three years to upgrade and improve public transit systems across Canada including investments in energy efficient buses, increasing accessibility of public transit, integrating alternative and active transportation into public transit systems and repairing transit infrastructure.

Through the \$2 billion, 11 year National Trade Corridors Fund, Canada is also supporting investments in transportation infrastructure – including ports, airports, railways, border crossings – to address urgent capacity constraints and freight bottlenecks to strengthen the efficiency and reliability of trade-related transportation systems in Canada.

Using cleaner fuels

The federal government published a discussion paper to inform development of a **clean fuel standard** to reduce emissions from fuels used in transportation, buildings and industry. British Columbia amended the *Greenhouse Gas Reduction (Clean Energy) Regulation* to support the use of renewable natural gas. Québec is requiring 2% renewable content in diesel and 5% in gasoline. Saskatchewan, New Brunswick, and Ontario are investigating renewable and low carbon fuel options.

INDUSTRY

Reducing methane and HFC emissions

The federal government published draft **regulations to reduce methane emissions** from the oil and gas sector, based on close collaboration with provincial and territorial governments on the approach. The federal government is also working to publish final regulations on the phase down of hydrofluorocarbons (HFCs).

Provinces and territories have also been active to reduce methane and HFCs. British Columbia has a pilot for a Clean Infrastructure Royalty Credit Program and the Greenhouse Gas Industrial Reporting and Control Act for liquid natural gas emissions intensity benchmarks. Alberta is using emission offset protocols to reduce industrial methane emissions, including the Quantification Protocol for Greenhouse Gas Emission Reductions from Pneumatic Devices. Saskatchewan, Newfoundland and Labrador and Québec continue their work in this area.

Improving industrial energy efficiency

New Brunswick is expanding its industrial energy efficiency programming. Northwest Territories is assessing the potential for industrial efficiency improvements, and Newfoundland and Labrador is setting performance standards to reduce GHG emissions from large industry.

The federal government launched the new ENERGY STAR for Industry certification and challenge programs, and is working with British Columbia to provide joint incentives to implement ISO 50001 energy management systems.

The Commission for Environmental Cooperation (CEC) North American Energy Management Pilot equipped industrial companies across North America with resources to reduce energy consumption and GHG emissions.

Investing in technology

The federal government is investing \$50 million in oil and gas sector technologies to reduce GHG emissions, including a \$10 million investment in the Alberta Carbon Conversion Technology Centre.

British Columbia launched a Technology Strategy, \$100 million Tech Fund and a \$27 million Cement Low Carbon Fuel Program, and made a commitment to establish an

Emerging Economy Task Force and Innovation Commission. Québec invested in technology and innovation in several sectors including electric vehicles and green technology.

FORESTRY, AGRICULTURE AND WASTE

Increasing stored carbon

The \$2 billion Low Carbon Economy Fund announced by the federal government supports new and expanded provincial and territorial actions to reduce GHG emissions, including through enhanced carbon storage in forests and agricultural soils. Approved provincial/territorial projects under the Low Carbon Economy Leadership Fund will launch in 2018.

British Columbia announced a \$150 million investment to enhance the carbon storage potential of its public forests, and is also developing new tools for environmental farm management. Northwest Territories has launched a Forest Industry Development Strategy to provide guidance on further developing the forest industry. New Brunswick, Québec, British Columbia, and Alberta have been combatting pest epidemics through early intervention and monitoring, reforestation, and ongoing treatment of affected areas to limit the damage to forest health.

The Québec–Ontario Cooperation for Agri-Food Research Program is funding collaborative research on climate change impacts on soil health, food processing and food safety in order to develop best practices and adaptation and mitigation strategies.

Increasing the use of wood for construction

Federal, provincial, and territorial governments have made significant investments to increase the use of wood in construction. The federal government is investing \$39.8 million over four years in the Green Construction through Wood Program.

Ontario is investing \$4.8 million for the Mass Timber Building Project and Québec is investing \$11 million for the Wood Building Demonstration Program.

A number of jurisdictions including Alberta, British Columbia, New Brunswick, and Québec have Wood Charters or wood use policies that encourage the use of wood products in construction, and some provinces are increasing the use of wood and other low-carbon renewable materials in municipal and government-funded buildings. Some jurisdictions are also allocating funds for research, demonstration projects, and training programs on wood construction.

Generating bioenergy and bio products

Action has been taken to bring cleaner bioenergy to communities that rely on fossil fuels, including through federal investments of \$55 million in support of bioheating as part of the federal Promoting Clean Energy for Remote Communities program. Ontario's Wood Stove Exchange Program will offer financial incentives to homeowners in northern, rural, and Indigenous communities to replace existing wood heating or fossil fuel appliances with new, high-efficiency, modern wood heating systems. The Whitesand First Nation in Ontario aims to replace diesel power generation by constructing a combined heat and power cogeneration plant and a wood pellet plant.

Jurisdictions are also investing to increase Canada's competitiveness in bioproducts and biofuels. Yukon invested \$187,000 to support biomass development and New Brunswick launched a Forest Biomass Policy for companies to harvest biomass for either energy production or fuel production. Québec is leading the transformation and modernization of its forest products industry through, for example, its Wood

Innovation Work Plan with over \$86 million in government investments by 2022. Alberta has supported bioenergy and biofuels through investment in the Bioenergy Producer Program and development of emission offset protocols including the Biofuel Production and Usage Protocol and Energy Generation from Biomass Protocol.

Advancing innovation in GHG-efficient management practices in forestry and agriculture

The federal government has committed to invest in research and innovation to support the agriculture industry, including \$70 million for science and innovation with a focus on climate change and soil and water conservation, \$25 million for adoption of clean technology by Canadian agricultural producers, \$27 million for innovative projects to help farmers mitigate GHG emissions and \$2.35 million to attract youth to green jobs within the agriculture and agri-food sector. The federal government is also helping evaluate potential climate impacts on regional agricultural production to build risk mitigation tools and support adaptation.

The Canadian Council of Forest Ministers released a Forest Bioeconomy Framework for Canada to promote the use of forest biomass for advanced bioproducts and advance innovation in the forest sector.

Provincial and territorial governments have also taken action within their jurisdictions. Alberta has a number of agriculture programs to address climate change, Saskatchewan continues to invest in research and development, New Brunswick is researching carbon sequestration in agriculture, Nova Scotia is hiring an on-farm energy auditor to reduce agriculture's carbon footprint, and Manitoba, Ontario, and Québec are developing a range of new programming related to agriculture and climate change. Yukon and Northwest Territories are assessing the impacts of climate change on agriculture and traditional foods in the north.

GOVERNMENT LEADERSHIP

Setting ambitious targets

The federal government has committed to reducing its GHG emissions by 40% by 2030, or earlier. Public reporting in July 2017 showed that federal GHG emissions decreased by 19% between 2005-06 and 2014-15.

In 2017, Canada released its GHG emissions inventory of federal operations online and will continue to report on progress.

Other actions from jurisdictions include Manitoba's work to benchmark building energy and water use for government buildings, Newfoundland and Labrador's greening government action plan, Nova Scotia's policies to reduce emissions, Nunavut's internal assessments of operations, Saskatchewan's certification of green buildings and New Brunswick's update of its green building policy.

Cutting emissions from government buildings and fleets

The federal government is investing in actions to reduce its emissions, including \$1 billion to modernize heating and cooling plants in the National Capital Region, and \$29.7 million for technical support to help federal organizations cut GHG emissions from their buildings and fleets. British Columbia continues its commitment to be a carbon neutral government and has also launched a *Wood First Act*, a LEED Gold equivalent requirement for public sector buildings, and an EV charging infrastructure procurement initiative. New Brunswick is retrofitting public buildings and purchasing plug-in hybrid vehicles for its fleet. Québec plans to reduce the petroleum fuel consumption of the governmental and para-governmental light vehicle fleet. Under Newfoundland and Labrador's Build Better Buildings Policy, new buildings strive for

	LEED Silver status. Northwest Territories has set a target for all new government buildings to exceed the National Energy Code for Buildings by 10%.
<i>Scaling up clean procurement</i>	<p>The Government of Canada allocated \$29.9 million to offer services supporting greening government operations.</p> <p>Québec has committed to developing a tool to guide public procurement. As well, it has developed a plan for integrating eco-responsible performance criteria into public bidding processes, in order to increase the volume of environmentally responsible acquisitions in the public service.</p>

INTERNATIONAL LEADERSHIP

<i>Delivering on Canada's international climate finance commitments</i>	<p>Canada is taking an innovative approach to mobilizing private sector financing and partnering with multilateral development banks to help remove barriers to private investment. In 2017, Canada announced the \$200 million second phase of the Canadian Climate Fund for the Private Sector in Asia, administered by the Asian Development Bank. In 2018, Canada will finalize and announce additional agreements with partners to deliver and implement Canada's climate finance commitment. It is expected that all agreements with partners will be finalized by the end of Fiscal Year 2020-21.</p> <p>Québec decided to respond directly to the appeal by the United Nations to increase the international funding of climate actions in developing countries by announcing climate cooperation measures totalling \$25.5 million, mainly for Francophone countries that are most vulnerable to the impacts of climate change.</p>
<i>Acquiring internationally transferred mitigation outcomes</i>	<p>The International Mitigation Project Team completed work to assess opportunities and risks and to provide considerations to inform Canada's approach to internationally transferred mitigation outcomes (ITMOs). The International Mitigation Project Team report will be presented to Ministers of Environment at their 2017 meeting.</p>
<i>Engaging in trade and climate policy</i>	<p>This year, Canada co-sponsored a workshop on trade and climate change that was held on the margins of the World Trade Organization (WTO) Committee on Trade and Environment (CTE). The federal government continues to advance discussions on trade and climate change in the WTO, Organization for Economic Cooperation and Development (OECD), and other international organizations. Saskatchewan began work to investigate opportunities for offsets and ITMOs and to contribute to the development of Carbon Capture and Storage international standards.</p> <p>In June 2017, Canada's Feminist International Assistance Policy was launched, with Environment and Climate Action as a key area for action. The Policy recognizes that communities around the world, particularly the poorest and most vulnerable, are experiencing the destabilizing effects of climate change and reaffirms Canada's commitment to combatting climate change and its impacts.</p> <p>Canada is leading and partnering to advance international initiatives under the Clean Energy Ministerial related to women in clean energy, energy efficiency (in industry, buildings, and appliances), electric vehicles, and smart grids. In 2019 Canada will host the Clean Energy Ministerial/Mission Innovation for the first time. By hosting this ministerial event, Canada is positioning itself as a global leader on clean energy and innovation and showcasing Canadian clean energy solutions, providing business opportunities for Canadian clean energy companies.</p>

ADAPTATION AND CLIMATE RESILIENCE

TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION

Providing authoritative climate information

The federal government has announced funding and is working with partners to develop the Canadian Centre for Climate Services. The Centre will provide authoritative climate information, data and tools to support adaptation decision-making in Canada.

Provinces and territories are advancing efforts to equip Canadians with the information they need, including future climate projections in British Columbia, LiDAR imaging data in New Brunswick, information and resources to support adaptation decision-making in Nunavut, regional climate modelling, monitoring, and updated Intensity Frequency and Duration Curves in Ontario, and climate-scenario research and services in Québec.

Building regional adaptation capacity and expertise

The federal government has announced funding and is consulting with stakeholders to develop the Building Regional Adaptation Capacity and Expertise program.

Provinces and territories are collaborating to build capacity on a regional basis (e.g., Atlantic and western provinces). Québec provided \$12.7 million over three years to the Ouranos Consortium to support multidisciplinary applied research projects on climate change impacts, vulnerabilities and the development of adaptation solutions. Manitoba is providing \$400,000 for the creation of the Prairie Climate Centre to develop climate data to inform decision-making and address climate impacts.

BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE

Investing in infrastructure to build climate resilience

The federal government has launched the Investing in Canada Plan, which will provide \$9.2 billion to provinces and territories through Integrated Bilateral Agreements, including projects supporting adaptation and resilience; and \$2 billion through the Disaster Mitigation and Adaptation Fund.

The federal government also launched the \$16.35 million Transportation Assets Risk Assessment initiative to support those responsible for federal transportation infrastructure assets in identifying and better understanding the climate risks to their assets, and the potential adaptation solutions that could be employed to reduce them.

Developing climate-resilient codes and standards

The federal government, in delivering the Climate Resilient Buildings and Core Public Infrastructure Project, is undertaking work to integrate climate resilience into new buildings and core public infrastructure, and is facilitating development of updated guidance and standards to support climate-resilient infrastructure decision-making.

British Columbia, Alberta, New Brunswick, Northwest Territories, Nova Scotia, Nunavut, and Ontario are supporting the federal government in the development of climate-resilient codes and standards, including building codes and guidelines

that support climate-resilient infrastructure decision-making within their jurisdictions.

PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING

Addressing climate change-related health risks

With partners and stakeholders, the federal government has taken concrete actions to prevent and prepare for heat-related illnesses. This includes the launch of a National Heat Health Community of Practice with key stakeholders, formally tabled Federal Framework on Lyme Disease and action plan. The government continues to increase capacity to prevent, identify, and manage climate-driven infectious diseases as well as engage with key partners to support health research, monitoring and surveillance. In addition, the first call for proposals under the Infectious Diseases and Climate Change Fund was issued to address the impact of climate change on human health by building and increasing access to infectious disease-based evidence, education and awareness.

Provinces and territories are advancing efforts to protect human health. Québec, New Brunswick and Manitoba are taking steps towards developing surveillance and warning systems for heat. Québec has supported research to link the problem of zoonosis in the context of climate change and made efforts towards providing health authorities with tools to track adaptation to climate change. Yukon is monitoring the health impacts of extreme weather events and wildfires and Nunavut has increased awareness of the human risks associated with climate change in Nunavut.

Supporting healthy Indigenous Peoples

The federal government has supported community-based health adaptation with First Nations, Inuit and the Métis Nation.

SUPPORTING PARTICULARLY VULNERABLE REGIONS

Investing in resilient infrastructure to protect vulnerable regions

The federal government continues to engage Northern jurisdictions and stakeholders under the Northern Transportation Adaptation Initiative, and announced funding under the Investing in Canada Plan that will build resilience in vulnerable regions (i.e., Indigenous, coastal and northern communities).

Provinces and territories are advancing efforts to improve flood protection, including Manitoba's commitment to invest \$1 billion annually to improve flood protection, Yukon's monitoring and surveillance of transportation infrastructure, Nova Scotia vulnerability assessments to inform dyke maintenance, and New Brunswick's adaptation planning. Newfoundland and Labrador, Prince Edward Island, Northwest Territories, and Nunavut are supporting climate-resilient infrastructure in vulnerable regions.

Building climate resilience in the North

The federal government is working with provinces, territories, northern governments and Indigenous organizations to finalize the Northern Adaptation Strategy and continues to make investments through the Climate Change Preparedness in the North program to strengthen northern adaptation capacities. The federal government renewed the Northern Transportation Adaptation Initiative to continue to build northern capacity and support the research and development of new tools and technologies for adapting northern transportation to climate change.

Ontario and Quebec, are improving the resilience of northern infrastructure, including transportation infrastructure, to the impacts of climate change. Manitoba is facilitating the sharing of information and local knowledge in northern

Supporting community-based monitoring by Indigenous Peoples

communities. Québec is monitoring ice movements along Nunavik coast and supporting projects to improve the resiliency of transportation infrastructure. The Northwest Territories is supporting adaptation planning in the North.

The federal government launched a new program to support community-based monitoring and the pairing of Indigenous Knowledge and western science.

Provinces and territories are working in close collaboration with Indigenous Peoples to support community-based monitoring and the sharing of Indigenous Knowledge. This has included efforts to support intergenerational dialogue with students in Nunavik in Québec, monitoring of traditionally harvested foods in Saskatchewan, building technical capacities of Indigenous Peoples in Ontario, and supporting community-based monitoring activities in Alberta, the Northwest Territories, and Nunavut.

Supporting adaptation in coastal regions

The federal government will continue to provide scientific information and data to inform and improve predictions of climate change in vulnerable coastal regions through the renewal of the Aquatic Climate Change Adaptation Services Program.

Provinces and territories are supporting efforts to identify and assess the vulnerability of coastal communities and infrastructure. British Columbia is updating flood plain maps and developing a Flood Hazard Strategy. Newfoundland and Labrador and Yukon are improving monitoring capabilities in coastal regions in. New Brunswick, Northwest Territories, Prince Edward Island, Nunavut, and Québec are completing vulnerability assessments and/or supporting adaptation planning in coastal communities.

REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS

Investing in infrastructure to reduce disaster risks

The federal government, through the Investing in Canada Plan, will prioritize investments in infrastructure to reduce disaster risks and protect communities and continues to support provinces and territories through the National Disaster Mitigation Program including British Columbia and Newfoundland and Labrador.

Alberta and Ontario are advancing efforts to support municipalities and communities in building long-term resilience to flooding and drought events. Quebec is developing a framework (Cadre pour la prévention des sinistres 2013-2020) that helps municipalities prevent disasters, coastal erosion and landslides through adaptation planning. Nunavut is sharing best practices. Manitoba, New Brunswick, and Northwest Territories are prioritizing investments in infrastructure.

Advancing efforts to protect against floods

Under the National Disaster Mitigation Program, the federal government has advanced efforts to protect against floods, including the development and modernization of flood maps, the publication of the Floodplain Mapping Guidelines, and support for Alberta, Manitoba, New Brunswick, Prince Edward Island, and Saskatchewan in assessing flood risks.

Alberta, British Columbia, Manitoba, Saskatchewan, Nova Scotia, Newfoundland and Labrador, the Northwest Territories, and Québec have supported flood risk mapping, adaptation planning, monitoring and flood risk assessments to better understand, address and reduce flooding risks within their jurisdictions.

Supporting adaptation by Indigenous Peoples

The federal government continues to support the integration of climate information into decision-making processes through the First Nation Adapt

program. The program works with First Nation communities to identify region-specific priorities, impacts and opportunities for climate change projects. The program prioritizes First Nation communities most impacted by climate change related to sea level rise, flooding, forest fires, and winter road failures. The program was expanded in 2017 to include a focus on floodplain mapping on-reserve.

Some provinces and territories are supporting Indigenous Peoples by supporting community-based monitoring of sea-ice in Nunavut, assessing the political processes and governmental structures for adaptation in Nunavik in Québec, and by providing training for community climate change champions in Yukon.

CLEAN TECHNOLOGY, INNOVATION AND JOBS

BUILDING EARLY-STAGE INNOVATION

Supporting early-stage technology development

Federal, provincial, and territorial governments are supporting new approaches to early-stage technology development to advance research in areas that have the potential to substantially reduce GHG emissions and other pollutants. For example, the new Clean Growth Hub announced through Budget 2017 supports several clean technology actions across all stages of the innovation spectrum, including at the early-stage technology development.

The Federal-Provincial-Territorial Working Group on Clean Growth is working to identify breakthrough technology missions or challenge areas of new programs such as the clean technology stream of Impact Canada and other similar initiatives.

Provinces and territories are also taking action to build early-stage innovation. Examples include Ontario's newly launched challenge to innovators to propose solutions to help Ontario industry reduce GHG emissions and its new program to fund costs of large-scale transformative research. Québec has a new Research and Innovation Strategy (SQRI) – Oser innover [Dare to Innovate] and is working under the Energy Policy's 2017-2020 action plan to achieve a 25% increase in the number of technological innovation projects, funded between now and 2020. In May 2017, Québec also launched a \$3 million call for proposals to create a research chair for the development of green technologies.

Mission-oriented research and development

The Government of Canada allocated \$200 million in Budget 2017 to support clean technology research and the development, demonstration and adoption of clean technology in Canada's natural resources sectors. The Federal-Provincial-Territorial Working Group on Clean Growth is working to identify breakthrough technology missions or challenge areas of new programs and to map existing assets, programs and infrastructure supporting mission-oriented RD&D. Alberta and the federal government are collaborating through the Alberta-Canada Collaboration on Clean Energy Research and Technology and the Energy Innovation Program to support new and clean technologies. Ontario recently launched the Low Carbon Innovation Fund (LCIF) to help researchers, entrepreneurs and companies create and commercialize new, globally competitive, low-carbon technologies that will help Ontario meet its

GHG emissions reductions targets. Alberta recently announced the Oil Sands Innovation challenge to reduce GHG emissions and improve cost competitiveness of bitumen production and announced funding commitments to 12 innovative methane-reducing technology projects.

ACCELERATING COMMERCIALIZATION AND GROWTH

Access to government programs

The new federal government Clean Growth Hub is working to improve client service and clean technology policy coordination across Canada. The Federal-Provincial-Territorial Working Group on Clean Growth is developing a new national network of clean technology incubators and accelerators. Québec and the federal government partnered to offer services, namely through Entreprises Québec and Infos Entrepreneurs, to assist entrepreneurs.

Increasing support to advance and commercialize innovative technologies

Federal, provincial, and territorial governments are working together to enable access to capital for clean technology businesses to bring their products and services to market. The federal government is supporting access to capital to help Canada's clean technology firms grow and expand through growth and project financing, funding projects across Canada to develop and demonstrate new clean technologies that promote sustainable development, and through a suite of innovation initiatives in Budget 2017 to support Canada's innovators. Alberta is working with Business Development Bank of Canada on how to draft letters of intent, British Columbia and the federal government recently announced a partnership between the Innovative Clean Energy (ICE) Fund and the SD Tech Fund™ to support the development of pre-commercial clean energy projects and technologies, and Québec is working with SDTC to support innovation in energy and in GHG emissions reduction in Québec as well as with Ecofuel Accelerator to support start-up companies working in the clean technology sector, and Nova Scotia and the Atlantic Canada Opportunities Agency (ACOA) announced new support for Nova Scotia start-ups in the ocean and clean technology sectors. Québec also announced a new innovation assistance program which will cover development and commercialization of new clean technologies. Ontario is currently developing a CleanTech Strategy and has made significant investments into its cleantech network. New work was recently announced by firms in Alberta, British Columbia, and Ontario working to advance technology solutions for reducing GHG emissions and increasing energy efficiency in Canada's oil sands.

Ontario's Cleantech Equity Fund initiative is a \$55 million investment that will focus on providing venture capital to high potential, innovative Ontario-based cleantech businesses.

Strengthening support for skills development and business leadership

Federal, provincial, and territorial governments are working together to strengthen skills development and business-leadership capacity through a number of efforts. The Federal-Provincial-Territorial Working Group on Clean Growth is collaborating with other working groups to share information to support talent, skills training and development opportunities. Saskatchewan engaged the tech sector on skills shortages in ICT, Québec developed a labour market strategy addressing clean tech sector needs, Ontario invested to help Indigenous communities address climate change and support economic growth and the adoption of clean technology solutions, and British Columbia held job fairs in Silicon Valley to attract high-skills talent.

Expedite immigration of highly qualified personnel

The Government of Canada's new Global Skills Strategy gives employers a faster and more predictable process for attracting top talent and new skills to Canada and the new Global Talent Stream allows companies access to a new streamlined hiring process. Québec is offering tax breaks for foreign researchers and experts to help businesses find employees with high-level skills needed to carry out their innovation projects.

Promoting exports of clean technology goods and services

The Government of Canada is working on an international business development strategy to support Canadian clean technology firms to become world leaders and capitalize on global market opportunities. The Federal-Provincial-Territorial Working Group on Clean Growth is working to establish a Pan-Canadian approach for clean technology export support to increase Canadian clean technology exports and growth of globally competitive Canadian clean technology producers, and is also working to develop Canada's clean technology value proposition for foreign-direct investment targets. The federal and provincial governments are investing to provide Atlantic firms with training, intelligence and market analysis and in-market engagement activities through the Atlantic Trade and Investment Growth Strategy.

British Columbia is collaborating with Washington State to establish the Cascadia Innovation Corridor to help grow the high-tech, life sciences, clean technology, and data analytics industries across borders. Québec launched the 2016-2020 Québec Export Strategy which identifies priority actions to support the clean technology sector and the International Climate Cooperation Program to support the transfer, adoption and deployment of clean technologies to developing Francophone countries vulnerable to the impacts of climate change.

Standards-setting

The Government of Canada is supporting the Standards Council of Canada (SCC) to develop a strategy to support Canadian clean technology entrepreneurs through the use of standards to accelerate commercialization, time to market and secure access to a wider range of market. Ontario recently released a Cleantech Strategy to streamline industry standards.

FOSTERING ADOPTION

Leading by example: greening government operations

Work is underway by federal, provincial, and territorial governments to develop action plans for greening government operations and encourage utilities and municipalities and other public sector entities to adopt clean technologies to lead by example.

The federal government launched Innovative Solutions Canada (TBC), a new innovation procurement program to enhance early stage clean technology R&D and clean technology innovation.

The Federal-Provincial-Territorial Working Group on Clean Growth is working to promote innovation and better connect clean technology producers to opportunities. The working group is also developing a procurement resource toolkit for municipalities, universities, schools and hospitals to help them leverage existing green procurement initiatives or adopt similar practices.

The Atlantic Energy Gateway (AEG) is working to contribute to the development of Atlantic Canada's clean energy resources by identifying the opportunities and assisting in evaluating the advantages of the region's substantial and diversified renewable energy potential for wind, tidal, biomass/biofuels, and hydro.

Most provinces and territories are taking action to reduce emissions by greening government operations. British Columbia implemented the Carbon Neutral

Government program and created a procurement concierge service to connect commercial-ready vendors to government buyers. British Columbia is working on policy options for increasing the use of low carbon building materials in new LEED certified public sector facilities. Saskatchewan is undertaking research and experiments into drought resistant cropping and the vulnerability of forests to climate change. Manitoba has a GHG emissions summary of government buildings and new guidelines for construction waste diversion and building air-leakage testing. Ontario is supporting technology-driven small and medium-sized enterprises (SMEs) and the procurement and adoption of Ontario Clean technologies. Québec developed a plan for integrating eco-responsible performance criteria into public bidding processes and tools to promote public procurement of clean technologies. Québec is also investing in renewable energies for heating for schools and investments to improve energy efficiency. New Brunswick has a green procurement policy. Newfoundland and Labrador is working to accredit public buildings under the LEED sustainable buildings rating system. Prince Edward Island is striving to reach 100% renewable energy production within the province by 2050 and is reviewing 20 potential Innovative Energy Projects. Northwest Territories is promoting energy efficiency retrofits and biomass heating systems in government buildings, and Nunavut is studying potential options to green government operations.

Supporting Indigenous Peoples and northern and remote communities to adopt and adapt clean technologies

The Government of Canada and Ontario are working together to fund a new biomass and wood processing facility for Whitesand First Nation that will provide clean energy and jobs. The Government of Alberta is supporting Alberta Indigenous communities or Indigenous organizations to install solar photovoltaic systems on facilities owned by the community or organization. Manitoba co-hosted a Pan-Canadian Summit on Reducing Diesel in Remote Communities to identify options to improve access to diesel alternatives in Northern, remote and Indigenous communities. Québec has multiple initiatives underway, including a pilot project for energy recovery of residual materials in northern areas and the Residual Forest Biomass Program to promote the use of biomass instead of fossil fuels and announced the creation of a fund dedicated to promote the use of biomass in the north to replace fossil fuels. The province also committed to forming an advisory council for Aboriginal communities to improve consultation on energy issues. Nunavut continues to explore options that reduce dependence on fossil fuels for all of its remote communities.

Consumer and industry adoption

The Government of Canada is working to promote consumer and industry adoption of clean technology through the development and release of 10 new and/or updated ENERGY STAR® technical specifications, and adding electric vehicle chargers and smart thermostats to the program for the first time. Regulations were amended in fall 2017, updating or introducing new standards for multiple product categories.

Ontario recently announced the Green Ontario Fund, a not-for-profit provincial agency that will deliver programs and rebates to help reduce energy costs in homes and businesses. The new Energy Efficiency Alberta established by the Alberta Government has launched a number of energy efficiency programs to generate energy savings across residential and commercial sectors. Québec is also investing in several programs that promote energy efficiency and GHG reductions across various sectors of the economy, including EcoPerformance and Programme d'aide Écocommionage.

STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS

Enhance alignment between federal, provincial, and territorial actions

The federal government is launching an online Clean Growth Collaboration Community to support Canadian clean technology innovators by facilitating interactions with the federal, provincial and territorial programs and services. The Federal-Provincial-Territorial Working Group on Clean Growth developed a Pan-Canadian vision statement on clean technology and clean growth that commits to improved program and policy collaboration and coordination across jurisdictions and institutions.

Québec is reviewing its financial support programs for business and innovation to harmonize and simplify its programming and is working with Treasury Board of Canada Secretariat to identify avenues for collaboration in the review of federal innovation programs.

Establishing a clean technology data strategy

The federal government has allocated \$14.5 million to develop a clean technology data strategy and in 2017, consultations with PTs, industry and other stakeholders were conducted via a Federal-Provincial-Territorial Working Group. Québec and Ontario are working together with Statistics Canada and the Subcommittee on the Federal Clean Tech Data Strategy to identify issues related to the definition of the cleantech sector.

CROSS-CUTTING

Canada

The Government of Canada is advancing meaningful engagement with First Nations, Inuit, and the Métis Nation during the Pan-Canadian Framework's implementation, including through three distinctions-based bilateral tables. As such, the tables provide opportunities for ongoing engagement with Indigenous Peoples in the implementation of the Pan-Canadian Framework and on broader climate change priorities.

In April 2017, Natural Resources Canada launched a national dialogue, Generation Energy, which invited Canadians to share their ideas and participate in building a vision for Canada's energy future through online participation, in-person panels and workshops. The feedback received will help to define Canada's energy future for the next generation, as Canada develops an energy policy direction to complement the work being done by the provinces and territories.

In October 2017, in Winnipeg, Manitoba, national and international stakeholders gathered for the Generation Energy Forum to discuss how Canada is preparing for the reliable, affordable, low-carbon energy economy of the future.

Alberta

Alberta continues to make progress on the implementation its Climate Leadership Plan.⁴ The Climate Leadership Plan is a made-in-Alberta strategy to reduce carbon emissions while diversifying the economy, creating jobs and protecting the province's health and environment. The Plan was created to mitigate GHG emissions and to transition to a lower carbon economy.

Alberta's Climate Leadership Plan includes a commitment to reinvest revenues from the carbon levy into Alberta's economy, including standing up of Energy Efficiency Alberta, a new public agency launched in 2017 that helps Albertans increase the energy efficiency of their homes, businesses, and communities.

⁴ <https://www.alberta.ca/climate-leadership-plan.aspx>

Ontario	Ontario is implementing its Climate Change Action Plan. ⁵ The plan outlines the key actions the government is taking to combat climate change, create good jobs in clean tech and construction, increase consumer choice, and generate opportunities for investment in Ontario. In August 2017, Ontario also launched the Green Ontario Fund, a non-profit provincial agency with planned funding of \$2.4 billion over the next 4 years funded through proceeds from the province's carbon market. The fund is tasked with reducing GHG pollution in buildings and industry to help meet Ontario's emission reduction targets.
Manitoba	Manitoba is establishing a new stand-alone Crown corporation—Efficiency Manitoba—to deliver energy efficiency programs and services in Manitoba.
Prince Edward Island	<p>Prince Edward Island has developed a 10-year Energy Strategy to reduce energy use, establish cleaner and locally produced energy sources and moderate future energy price increases.⁶ The Strategy is guided by three principles: lowering GHG emissions, cost-effectiveness, and creating local economic opportunities and will be implemented over the next 10 years.</p> <p>Prince Edward Island is in the process of developing a new Climate Change Action Plan on Mitigation and Adaptation. This plan will include actions designed to reduce GHG emissions, enhance carbon sequestration, and adapt to a changing climate. The Climate Change Action Plan on Mitigation is expected to be released this fall and implemented over the coming years.</p>
New Brunswick	New Brunswick is implementing its new comprehensive Climate Change Action Plan – Transitioning to a Low-Carbon Economy ⁷ , which commits the province to stronger action in both GHG emission reductions and in building resilience to the impacts of a changing climate.
Nova Scotia	Nova Scotia continues to build on the work outlined in its Climate Change Action Plan ⁸ by further reducing its GHG emissions and adapting to the changing environment.
Newfoundland and Labrador	Newfoundland and Labrador has committed to developing a new Climate Change Action Plan and has undertaken public consultations to inform next steps.
Yukon	Yukon is in the first stages of planning a new integrated strategy for energy, climate change and green economy in partnership with Yukon First Nations and municipalities. The plan is expected to be released in 2019.
Northwest Territories	Northwest Territories committed over \$2.7 million in 2017 to the Arctic Energy Alliance (AEA) to provide energy efficiency programs and services to residents, businesses, and communities.
Québec	Québec is implementing its 2013-2020 Climate Change Action plan. ⁹ The plan outlines the government's priorities and actions in the fight against climate change.

⁵ <https://www.ontario.ca/page/climate-change-action-plan>

⁶ http://www.peiec.ca/uploads/6/6/6/4/66648535/pei_energy_strategy_march2017_web.pdf

⁷ <http://www2.gnb.ca/content/gnb/en/departments/elg.html>

⁸ <https://climatechange.novascotia.ca/sites/default/files/uploads/ccap.pdf>

⁹ http://www.mddelcc.gouv.qc.ca/changements/plan_action/pacc2020.pdf

Québec is also modernizing its Environment Quality Act. The new provisions of the act will take into consideration GHG emissions as well as reduction and adaptation measures for all new projects requiring an environmental assessment.¹⁰

Québec created the Transition énergétique Québec (TEQ) in 2017 to support, stimulate, and promote the energy transition, innovation, and efficiency, and to coordinate the implementation of all the programs and actions necessary to achieve Québec's energy targets. Québec's Research and Innovation Strategy¹¹ will contribute to the development of economic solutions.

Atlantic Provinces

The Atlantic Clean Energy Partnership was launched in 2017 to identify potential enhancements to electricity generation and transmission, to promote energy efficiency, and to support clean energy technologies.

¹⁰ <http://www.mddelcc.gouv.qc.ca/lqe/autorisations/fiches/changements-climatiques.pdf>

¹¹ <https://www.economie.gouv.qc.ca/objectifs/informer/recherche-et-innovation/strategie-Quebecoise-de-la-recherche-et-de-l-innovation/>